

A11102 469200

NBS
PUBLICATIONS

NAT'L INST OF STANDARDS & TECH R.I.C.



A11102469200

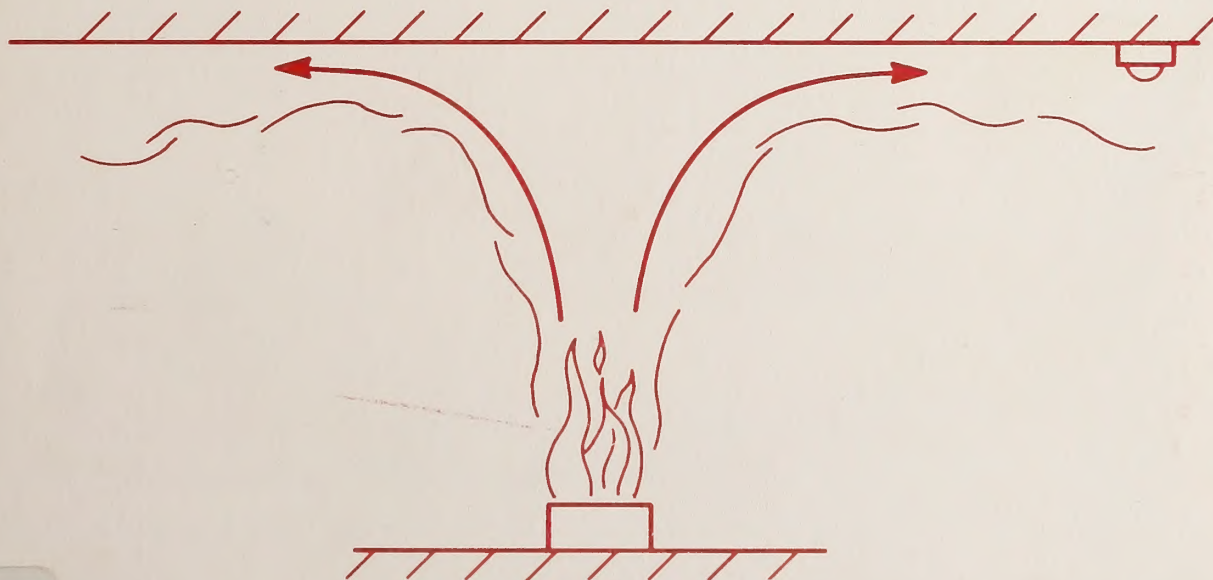
Stroup, David W/Evaluating thermal fire
QC100 .U57 NO.713 1986 V1986 C.1 NBS-PUB



NBS SPECIAL PUBLICATION 713

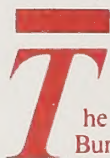
U.S. DEPARTMENT OF COMMERCE/National Bureau of Standards

Evaluating Thermal Fire Detection Systems (SI Units)



QC
100
.U57
No.713
1986
c.2

David Stroup • David Evans • Phyllis Martin



The National Bureau of Standards¹ was established by an act of Congress on March 3, 1901. The Bureau's overall goal is to strengthen and advance the nation's science and technology and facilitate their effective application for public benefit. To this end, the Bureau conducts research and provides: (1) a basis for the nation's physical measurement system, (2) scientific and technological services for industry and government, (3) a technical basis for equity in trade, and (4) technical services to promote public safety. The Bureau's technical work is performed by the National Measurement Laboratory, the National Engineering Laboratory, the Institute for Computer Sciences and Technology, and the Institute for Materials Science and Engineering.

The National Measurement Laboratory

Provides the national system of physical and chemical measurement; coordinates the system with measurement systems of other nations and furnishes essential services leading to accurate and uniform physical and chemical measurement throughout the Nation's scientific community, industry, and commerce; provides advisory and research services to other Government agencies; conducts physical and chemical research; develops, produces, and distributes Standard Reference Materials; and provides calibration services. The Laboratory consists of the following centers:

- Basic Standards²
- Radiation Research
- Chemical Physics
- Analytical Chemistry

The National Engineering Laboratory

Provides technology and technical services to the public and private sectors to address national needs and to solve national problems; conducts research in engineering and applied science in support of these efforts; builds and maintains competence in the necessary disciplines required to carry out this research and technical service; develops engineering data and measurement capabilities; provides engineering measurement traceability services; develops test methods and proposes engineering standards and code changes; develops and proposes new engineering practices; and develops and improves mechanisms to transfer results of its research to the ultimate user. The Laboratory consists of the following centers:

- Applied Mathematics
- Electronics and Electrical Engineering²
- Manufacturing Engineering
- Building Technology
- Fire Research
- Chemical Engineering²

The Institute for Computer Sciences and Technology

Conducts research and provides scientific and technical services to aid Federal agencies in the selection, acquisition, application, and use of computer technology to improve effectiveness and economy in Government operations in accordance with Public Law 89-306 (40 U.S.C. 759), relevant Executive Orders, and other directives; carries out this mission by managing the Federal Information Processing Standards Program, developing Federal ADP standards guidelines, and managing Federal participation in ADP voluntary standardization activities; provides scientific and technological advisory services and assistance to Federal agencies; and provides the technical foundation for computer-related policies of the Federal Government. The Institute consists of the following centers:

- Programming Science and Technology
- Computer Systems Engineering

The Institute for Materials Science and Engineering

Conducts research and provides measurements, data, standards, reference materials, quantitative understanding and other technical information fundamental to the processing, structure, properties and performance of materials; addresses the scientific basis for new advanced materials technologies; plans research around cross-country scientific themes such as nondestructive evaluation and phase diagram development; oversees Bureau-wide technical programs in nuclear reactor radiation research and nondestructive evaluation; and broadly disseminates generic technical information resulting from its programs. The Institute consists of the following Divisions:

- Ceramics
- Fracture and Deformation³
- Polymers
- Metallurgy
- Reactor Radiation

¹Headquarters and Laboratories at Gaithersburg, MD, unless otherwise noted; mailing address Gaithersburg, MD 20899.

²Some divisions within the center are located at Boulder, CO 80303.

³Located at Boulder, CO, with some elements at Gaithersburg, MD.

NBS special publication
...

NBS
RESEARCH
INFORMATION
CENTER

NBSC

QC100

.U57

NO. 713

1986

C.2

Evaluating Thermal Fire Detection Systems (SI Units)

David W. Stroup
David D. Evans
Phyllis Martin

National Bureau of Standards
National Engineering Laboratory
Center for Fire Research
Gaithersburg, Maryland 20899



U.S. DEPARTMENT OF COMMERCE, Malcolm Baldrige, Secretary
NATIONAL BUREAU OF STANDARDS, Ernest Ambler, Director

Issued April 1986

Library of Congress Catalog Card Number: 86-600520
National Bureau of Standards Special Publication 713
Natl. Bur. Stand. (U.S.), Spec. Publ. 713, 557 pages (Apr. 1986)
CODEN: XNBSAV

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON: 1986

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402

TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES.....	v
LIST OF FIGURES.....	v
NOMENCLATURE.....	vi
Abstract.....	1
1. INTRODUCTION.....	2
2. DESCRIPTION OF THE MODEL.....	3
2.1 Characteristic Fire.....	4
2.2 Temperature and Velocity Correlations.....	5
2.3 Detector Response Model.....	7
2.4 Velocity Correlation for $r/H < 0.3$	9
3. IMPLEMENTATION OF THE MODEL: COMPUTER PROGRAMS.....	10
3.1 General Program Structure.....	10
3.2 Main Program.....	12
3.2.1 Data Input Section.....	12
3.2.2 Calculation Initialization.....	12
3.2.3 Conversion and Output Section.....	13
3.3 Activation Time Equation Solution:	
Fixed Temperature.....	13
3.4 Activation Time Equation Solution:	
Rate of Temperature Rise.....	13
4. IMPLEMENTATION OF THE MODEL: TABLES OF RESULTS.....	14
5. EXAMPLES.....	16
5.1 Using the Tables.....	16
5.1.1 Example 1: Comparison with NFPA 72E	
Table Results.....	16
5.1.2 Example 2: Fixed Temperature vs.	
Rate of Rise.....	17
5.2 Example 3: Using the Computer Program.....	19
6. SUMMARY.....	21
7. REFERENCES.....	21
APPENDIX A - DETACT-T2 (FORTRAN VERSION).....	33

TABLE OF CONTENTS (continued)

	<u>Page</u>
APPENDIX B - DETACT-T2 (PC BASIC VERSION).....	43
APPENDIX C - DETECTOR ACTIVATION TIME TABLES: FIXED TEMPERATURE.....	51
APPENDIX D - DETECTOR ACTIVATION TIME TABLES: RATE OF TEMPERATURE RISE.....	301

NOTE: Appendixes C and D are available in English units in another version of this report.

LIST OF TABLES

	<u>Page</u>
Table 1. Heat Release Rates of Warehouse Materials.....	23
Table 2. Maximum Heat Release Rates from Fire Detection Institute Analysis.....	27
Table 3. RTI Values for any Listed Detector (Fixed Temperature Type).....	28
Table 4. RTI Values for any Listed Detector (Rate of Rise Type).....	29

LIST OF FIGURES

	<u>Page</u>
Figure 1. Plot of t^2 Fire Growth Curves.....	30
Figure 2. Plot of Dimensionless Velocity Correlation.....	31

NOMENCLATURE

A	$g/(C_p T_\infty \rho_\infty)$
C_p	specific heat capacity of ambient air
C_T	constant used in equations 9 and 11
C_W	constant used in equations 10 and 11
g	acceleration of gravity
H	vertical distance from fuel to ceiling
\dot{Q}	fire energy release rate
\dot{Q}^*	dimensionless fire energy release rate
r	radial distance from fire axis to the detector
RTI	response time index, the product of the detector thermal time constant and the square root of the gas velocity used in the test to measure the time constant [8].
t	time
t_2^*	dimensionless time, $t/[A^{-1/5} \alpha^{-1/5} H^{4/5}]$
$(t_2^*)_f$	dimensionless time for time delay for gas front travel.
T_∞	ambient temperature
T	gas temperature
T_s	temperature of detector sensing elements
ΔT	$T - T_\infty$

NOMENCLATURE (continued)

ΔT_2^*	dimensionless temperature difference, $\Delta T/[A^{2/5} (T_\infty/g) \alpha^{2/5} H^{-3/5}]$
U	gas velocity at the detector location
U_m	maximum gas velocity
U_2^*	dimensionless gas velocity, $U/[A \alpha H]^{1/5}$
α	proportionality constant for t^2 - fire growth = \dot{Q}/t^2
ρ_∞	ambient air density
τ	detector thermal time constant

Evaluating Thermal Fire Detection Systems [S.I. Units]

David W. Stroup
David D. Evans
Phyllis Martin

ABSTRACT

This report presents a methodology for evaluating heat detection systems installed in buildings. Previous work for use primarily in designing new thermal fire detection systems was used as a starting point. The previous work was enhanced and supplemented to make it more useful for evaluating existing systems. The resulting equations were programmed into a user interactive computer program. This program is available in both BASIC and FORTRAN and will run on mainframes as well as personal computers. In addition, a modified version of the FORTRAN program was used to develop an extensive set of tables listing detector activation times for given building geometries, detector characteristics, and fire growth rates. These tables are useful for quick evaluation of alternative heat detector installations. Finally, practical examples are included to illustrate the use of the tables and computer programs.

Keywords: fire alarm systems; fire detection; fire detection systems; fire hazard assessment; fire protection; fire suppression; heat detectors; sprinkler systems.

1. INTRODUCTION

Studies of the response of heat detectors to fire driven flows under confined ceilings have been conducted since the early 1970's [1,2,3,4,5]¹. Results of these largely experimental studies have been used to develop correlations of data that are useful under a broad range of fire conditions and building geometries. These correlations have been used to construct engineering methods to determine heat detector spacing, sprinkler response time, and smoke detector alarm times for industrial buildings where large undivided ceilings over storage and manufacturing facilities are common. The National Fire Protection Association (NFPA) has adopted an alternate design method for determining heat detector spacing which is based on some of these correlations.

This alternate design method is contained in Appendix C of the NFPA 72E standard [6], "Guide for Automatic Fire Detector Spacing," which consists of tables listing maximum allowable detector spacings for given room sizes and fire growth rates calculated from correlations of experimental measurements. The tabular form of presentation is useful for specifying design requirements in new installations. However, the tables are inconvenient to use in evaluating changes to existing detector systems where the spacing is fixed. There appears to be a need for a method which determines detector activation times for specified building geometries, detector characteristics, detector spacings, and fire growth rates. This method would be useful in evaluating the

¹ Numbers in brackets refer to literature references at the end of this report.

expected fire detection time for existing and proposed systems for use in determining available safe egress time, and the relative effectiveness of different detectors used at the same spacing.

This paper presents the results of work to develop an alternative method appropriate to existing installations. As part of this study, the basis for the calculation method published in Appendix C of the NFPA 72E standard was determined. Alternate correlations of the experimental data, used to develop the results presented in Appendix C of NFPA 72E, have been used to construct a FORTRAN program (DETECT-T2). This computer program evaluates the response time of heat detector systems [7]. In this work, a modified version of the DETECT-T2 program was used to generate tables of detector response times for a wide range of building geometries, detector characteristics, and fire growth rates. These calculated values for response time agree to within 5 percent of those published in the tables contained in Appendix C of the NFPA 72E standard.

2. DESCRIPTION OF THE MODEL

The problem of heat detector response is solved by predicting the time dependent temperature of the detector sensing element up to the point when it is heated to the specified alarm conditions. In order to predict the temperature of a heat detector element, it is necessary to describe the fire and the fire generated environment to which the detector is exposed. The primary fire related parameters which influence the response of heat detectors are the gas temperature and velocity. Once the fire-generated environmental

characteristics are known, a model of the response of the thermal sensing element in the detector is employed to calculate the detector element temperature as a function of time.

2.1 Characteristic Fire

Extensive full-scale tests have been conducted to determine the response of heat detectors [1-4]. These tests have studied two classes of fires. The first of these are steady fires. These fires have energy release rate histories which do not change with time. Results from work using this type of fire may be used to calculate heat detector response if the quasi-steady state assumption is invoked. In this case, a varying energy release rate history is approximated as a series of steady fires. In this type of analysis, the transport time of the gases to the detector is ignored. This usually results in a predicted actuation time which is earlier than that encountered in actual practice. This may or may not be acceptable depending on the case.

Another class of fires for which research results are available are called "t-squared" (t^2) fires. These fires have energy release rate histories which increase proportionally with the second power of time from ignition. This class of fires was used to develop the tables in the NFPA 72E document and will be used in this paper.

Appendix C of the NFPA 72E standard lists three fires which have t^2 type fire growth behavior. A slow developing fire is defined as one which would

take 600 seconds (10 minutes) from the time of flaming ignition until it reaches a heat release rate of 1055 kW (1000 BTU/s). A medium growth rate fire reaches a heat release rate of 1055 kW (1000 BTU/s) approximately 300 seconds (5 minutes) after flaming ignition occurs. The fast developing fire requires 150 seconds (2.5 minutes) to reach a heat release rate of 1055 kW (1000 BTU/s). In addition, a fourth t^2 fire has been developed in this report. This fire has been defined as one which takes 75 seconds (1.25 minutes) to reach a heat release rate of 1055 kW (1000 BTU/s). These four fire growth curves are plotted in Figure 1.

Table 1 is a reproduction of a table in NFPA 72E. It lists various warehouse commodities and their maximum fire heat release rates per unit floor area covered by the commodity. The time required for a fire, occurring in a particular commodity, to reach a heat release rate of 1055 kW is also listed. If possible, each commodity is identified with a specific fire growth behavior - slow, medium, fast, or ultrafast fire. Table 2 is a reproduction of another table found in Appendix C of NFPA 72E. It lists the maximum heat release rates for various furnishing type fuel items. Both of these tables are useful for estimating fire growth rates that may be expected from various fuel packages.

2.2 Temperature and Velocity Correlations

Values of the time dependent gas velocity and temperature for t^2 fires may be obtained from work by Heskestad and Delichatsios [4]. From experiments and use of dimensional arguments, they developed correlations of maximum

temperature rise and velocity for unconfined ceiling layer flows as a function of radial distance from the axis of fire plume impingement. These correlations of dimensionless maximum temperature rise and dimensionless maximum velocity are:

$$\Delta T_2^* = \begin{cases} 0, & t_2^* \leq (t_2^*)_f \\ \left[\frac{t_2^* - 0.954 (1 + r/H)}{0.188 + 0.313 r/H} \right]^{4/3}, & t_2^* > (t_2^*)_f \end{cases} \quad (1)$$

$$U_2^* / \sqrt{\Delta T_2^*} = 0.59 (r/H)^{-0.63} \quad (2)$$

where

$$t_2^* = t / [A^{-1/5} \alpha^{-1/5} H^{4/5}]$$

$$U_2^* = U / [A^{1/5} \alpha^{1/5} H^{1/5}]$$

$$\Delta T_2^* = \Delta T / [A^{2/5} (T_\infty/g) \alpha^{2/5} H^{-3/5}]$$

$$A = g / [C_p T_\infty \rho_\infty]$$

$$\alpha = \dot{Q} / t^2$$

$$(t_2^*)_f = 0.954 (1 + r/H)$$

These equations may be used to predict the fire-generated environment (gas temperature and velocity) near a detector.

2.3 Detector Response Model

Characterization of the thermal response of heat detector and sprinkler thermal sensing elements is discussed by Heskestad and Smith [8], and Evans [9]. The model for the detector sensing element temperature is based on a convective heat transfer process. The first order differential equation that describes the rate of temperature increase of the sensing element is:

$$\frac{dT_s}{dt} = \frac{U^{1/2}}{RTI} [T - T_s] \quad (3)$$

This equation predicts the temperature change of a detector with known thermal characteristics to a given time dependent gas flow temperature and velocity. In particular, the rate of change of the detector element temperature at any time is equal to the gas velocity to the one-half power multiplied by the difference between the temperature of the hot fire generated gas flow near the detector and the temperature of the detector element. All divided by the detector RTI or response time index.

The RTI is a measure of the detector's thermal lag and can be determined for sprinkler or heat detector sensing elements using the plunge test [8]. NFPA 72E reports detector sensitivity in terms of time constants, τ . At any given time, the time constant for a given type of detector may be calculated from the RTI using:

$$\tau = RTI / U^{1/2} \quad (4)$$

Tables 3 and 4 relate heat detector listed spacings to RTI values for fixed temperature detectors and rate of rise detectors respectively. These Tables were derived from results published in references 3 and 5.

Beyler [10] used the correlations of Heskestad and Delichatsios [4] to derive a new form of equation (3). He was able to solve this new form of the heat detector response equation analytically. Using the condition that the initial detector element temperature is equal to ambient temperature ($T_s = T_\infty$), the equations for calculating the response of fixed temperature and rate of temperature rise detectors are, from Beyler:

$$\frac{dT_s}{dt} = \frac{(4/3) (\Delta T / \Delta T_2^*) (\Delta T_2^*)^{1/4}}{(t/t_2^*) (0.188 + 0.313 r/H)} (1 - e^{-Y}) \quad (5)$$

$$T_s - T_s(0) = (\Delta T / \Delta T_2^*) \Delta T_2^* \left[1 - \frac{(1 - e^{-Y})}{Y} \right] \quad (6)$$

where

$$Y = \frac{3}{4} \left(\frac{U}{U_2^*} \right)^{1/2} \left(\frac{U_2^*}{\sqrt{\Delta T_2^*}} \right)^{1/2} \frac{\Delta T_2^*}{RTI} \left(\frac{t}{t_2^*} \right) (0.188 + 0.313 r/H)$$

Using equations (1) and (2), equations (5) and (6) may be solved to predict the response of sprinkler and heat detector sensing elements to fire-driven ceiling jet flows.

2.4 Velocity Correlation for $r/H < 0.3$

While this exact solution to equation (3) is applicable to any r/H value, the dimensionless velocity correlation, previously discussed, is only valid for r/H values greater than 0.3. In an effort to extend the usefulness of the detector response calculations, an analysis was made of the available data for ceiling jets at r/H values less than 0.3. Results of this analysis indicated a lack of much quantitative information for this region. Therefore, an analysis to develop a rational estimation of velocities in the ceiling jet close to the plume axis was undertaken by studying a simple extension of the velocities in the plume.

The dimensionless velocity and temperature change relations proposed by Heskestad and Delichatsios [4] together with equations proposed by Zukoski et. al. [11] to describe fire plume maximum temperature and velocity distributions were taken as a starting point.

$$U_2^* = U / [A^{1/5} \alpha^{1/5} H^{1/5}] \quad (7)$$

$$\Delta T_2^* = \Delta T / [A^{2/5} (T_\infty/g) \alpha^{2/5} H^{-3/5}] \quad (8)$$

$$\Delta T_m / T_\infty = C_T (\dot{Q}^*)^{2/3} \quad (9)$$

$$U_m = C_W g^{1/2} H^{1/2} (\dot{Q}^*)^{1/3} \quad (10)$$

These equations were used to obtain an expression of dimensionless maximum gas velocity in the same form as equation (2).

$$U_2^* / \sqrt{\Delta T_2^*} = C_W / \sqrt{C_T} \quad (11)$$

Using values suggested by Zukoski et. al. [11], the dimensionless gas velocity is found to be a constant at r/H values of less than 0.3. The complete dimensionless gas velocity equation for all values of r/H is:

$$U_2^* / \sqrt{\Delta T_2^*} = \begin{cases} 3.87 / \sqrt{9.115}, & r/H \leq 0.3 \\ 0.59 (r/H)^{-0.63}, & r/H > 0.3 \end{cases} \quad (12)$$

This equation is plotted in Figure 2. The two curves merge nicely. This equation together with the previously discussed correlations and analytic solution may be used to calculate any aspect of the response of thermal detectors to t^2 fires.

3. IMPLEMENTATION OF THE MODEL: COMPUTER PROGRAMS

3.1 General Program Structure

The equations discussed in Section 2 were programmed into a user interactive computer code called DETACT-T2. To evaluate the response of a detector, the user enters values for ambient air temperature, detector activation temperature and rate of temperature rise, detector RTI, fuel to ceiling distance, detector spacing, and a fire growth rate constant, α (for t^2 fires). The program solves the appropriate equation to obtain the response time for a fixed temperature detector and a rate of rise detector with the given characteristics. The fire energy release rate at each time step is also calculated.

The computer program is available in two versions. One version, contained in Appendix A, is written in FORTRAN 77. The program contains approximately 400 lines of source code and requires about 64k of computer memory in compiled form for execution. The source code may be compiled on any computer supporting an ANSI standard FORTRAN 77 compiler. The program has been compiled and run successfully on IBM² and compatible personal computers operating under MS-DOS³. A specially modified version of this program was used to generate the tables discussed in section 4.

The other version of the program, listed in Appendix B, is written in BASIC. It consists of approximately 350 lines of source code. This program has also been successfully tested on IBM and compatible micro-computers. Both programs have essentially the same structure and use the same variable names. To insure convergence, all variables are in double precision.

The program consists of three major sections. The main program reads and lists the required input data, performs the calculations necessary to set up the equations, calls the solution subroutines, and writes out the results. The second section is a subroutine which uses a Newton-Raphson technique to solve the equation describing the activation time of a fixed temperature detector. The last section is a subroutine which uses a bisection method to solve the

² IBM is a trademark of International Business Machines Corporation and does not represent an endorsement by the National Bureau of Standards.

³ MS and Microsoft are trademarks of Microsoft Corporation and do not represent an endorsement by the National Bureau of Standards.

rate of temperature rise detector activation time equation. Each of these sections is described in more detail below.

3.2 Main Program

3.2.1 Data Input Section

This section of the main program requests information from the user concerning the building geometry, the detector characteristics, and the fire growth rate. The user may also elect to enter data in either English or S.I. units.

3.2.2 Calculation Initialization

Several preliminary calculations must be made before the activation time equations may be solved. These calculations are done in the second section of the main program. In this section, the dimensionless time, velocity, and temperature are calculated. Based on the user-specified detector spacing, the maximum radial distance of the detector from the fire is calculated. After these calculations have been completed, the two activation time calculation subroutines are called. The results from these subroutines are converted into activation times, and the heat release rates are calculated.

3.2.3 Conversion and Output Section

The last section of the main program writes out the solutions to the equations. The results are printed in both English and S.I. units.

3.3 Activation Time Equation Solution: Fixed Temperature

The equation describing the activation time of a fixed temperature detector cannot be solved explicitly for activation time. Therefore, a numerical technique must be used. A Newton-Raphson technique was selected for use in solving the fixed temperature detector equation. This technique is discussed in most numerical methods textbooks [12].

The Newton-Raphson (or simply Newton's) method is one of the most powerful and well-known numerical methods for finding a root (solution) of $f(x) = 0$. To use this routine, the activation time equation is first adjusted to fit the appropriate form. This method converges very rapidly for the cases considered here.

3.4 Activation Time Equation Solution: Rate of Temperature Rise

A bisection technique was selected for use in solving the rate of rise activation time equation. This technique is also discussed in most numerical methods textbooks [12]. It was chosen for use in this instance because the

Newton method would have introduced stability problems into the calculation. This method also converges very rapidly for the cases considered here.

4. IMPLEMENTATION OF THE MODEL: TABLES OF RESULTS

The computer programs calculate detector activation times one case at a time. In many instances, it is necessary to evaluate a number of alternatives. It would be tedious and inconvenient to run a computer program to examine each case of interest. In light of this fact, the FORTRAN version of the computer program was used to generate an extensive set of tables. These tables list detector activation time as a function of building geometry, detector characteristics, and fire growth rate constants.

Each entry in the tables was checked by first calculating the response time of the given detector numerically. Then the calculated time is substituted into the exact form of the equation, and it is solved for the temperature of the detector sensing element at that time. In each case, the calculated temperature agreed with the originally assumed one to within an accuracy of 0.005 percent.

The tables cover a wide range of parameter variations. Tables have been developed for each of the four fire growth rates that were described earlier. Tables are available in both English and S.I. units. The S. I. units tables are contained in Appendixes C and D of this report. The English units tables are available in the English version [13].

For use with S.I. units, tables cover detector spacings of 0 to 15 meters and ceiling heights of 1 to 24 meters. RTI values range from 0 to 400 (m-s)^{1/2} for fixed temperature detectors and from 50 to 1000 (m-s)^{1/2} for rate of rise detectors. Temperature differences for fixed temperature detectors range from 5 to 80 degrees C, and available rate of temperature rise values are 8, 10, and 14 degrees C/minute.

The tables of detector activation times are organized according to: type of detector (fixed temperature or rate of temperature rise), detector spacing, and type of fire (ultrafast, fast, medium, or slow). Appendix C contains the tables listing activation times for fixed temperature heat detectors, and Appendix D contains the tables listing activation times for rate of temperature rise detectors. In each appendix, the tables are arranged in order of increasing detector spacing (i.e. 0 m, .5 m, 1 m, etc.). For each spacing, the tables are arranged according to fire type. Ultrafast is first, followed by fast, medium, and slow.

The asterisks next to some of the table entries indicate that the detector location places it within the $r/H < 0.3$ region. This region is where the theoretical dimensionless velocity correlation, discussed in section 2.4, is applicable. These values are flagged because the calculation of gas velocity in this region is based primarily on a theoretical analysis and not on a combination of theory and experiment. In addition, this region is not considered in the NFPA 72E Appendix C.

Finally, just as in Appendix C of NFPA 72E, for the tables in this report, the fire plume is assumed to impinge on the ceiling at the center of the square array of detectors spaced as indicated. So for detectors spaced at 5 m (16.4 ft), the distance of each detector from the gas impingement point would be 3.53 m ($5\sqrt{2}/2$). Each table indicates this distance in parenthesis after the table spacing value.

5. EXAMPLES

5.1 Using the Tables

5.1.1 Example 1: Comparison with NFPA 72E Table Results

The first example will show that these new tables agree quite well with the results from the tables in Appendix C of NFPA 72E even though each set of tables were generated using different correlations of experimental data. Assume a system of detectors is installed using a 3.5 meter spacing in a room with a 4 meter ceiling height. A medium fire growth rate is expected. The detectors have an RTI rating of $150 \text{ (m-s)}^{1/2}$ which corresponds to a 121.5 second time constant. The ambient temperature is 21 degrees C and the rated activation temperature of the detector is 81 degrees C. This gives a temperature difference of 60 degrees.

$$\Delta T = T_{\text{act}} - T_{\text{amb}} = 81 - 21 = 60 \text{ degrees C}$$

Looking in Appendix C, a detection system installed using a 3.5 meter spacing would detect a medium growth rate fire 5.52 minutes after ignition. If we next look for similar conditions in the 72E tables [NFPA, p. 72E-36], we find that detectors with a time constant of 100 s installed using a 3.5 m (11.5 ft) spacing in a room with a 3.66 m (12 ft) ceiling height will activate when a medium growth rate fire reaches a heat release rate of 1055 kW. A medium growth rate fire will reach this heat release rate 300 seconds or five minutes after ignition.

The detector listed in the NFPA table has a time constant of 100 s, and its activation temperature difference is about 55.5 degrees. These are slightly less than the 121.5 s and 60 degrees C, respectively, for the detector listed in the NBS table. Therefore, it is expected that the detector listed in the NBS table would have an activation time slightly higher than the one in the NFPA table. After extensive cross checks between the new NBS tables and the 72E tables, the results were found to agree to within 5 percent.

5.1.2 Example 2: Fixed Temperature vs. Rate of Rise

This example will show how alternative heat detector installations may be compared using the tabular results. In particular, the differences between fixed temperature and rate of rise detectors will be compared. Suppose a detection system is installed in a room with a ceiling height of 12 meters and detection of a medium fire is desired. The detectors are spaced 7 meters apart. Currently, fixed temperature detectors with an RTI of $150 \text{ (m-s)}^{1/2}$ and

an activation temperature rating of 81 degrees C are installed in the room. Ambient temperature is 21 degrees C. (Temperature differential of 60 degrees.) Will the use of rate of rise detectors with the same RTI as the fixed temperature detectors and an activation rate of rise rating of 8 degrees C/min yield a lesser time to activate a detector in response to a medium growth rate fire?

From Appendix C, the activation time of the fixed temperature detectors, installed using a 7.0 meter spacing and exposed to a medium growth rate fire, is 13.64 minutes. The time required to activate the rate of rise detectors is obtained from Appendix D. The activation time for these detectors is 15.82 minutes. From Figure 1, the heat release rate at activation of the rate of rise detectors would be 10,561 kW compared to 7851 kW for the fixed temperature detectors.

It would take about three minutes longer to activate the rate of rise detectors, and the fire heat release rate would have increased by about 2710 kW. This is interesting in light of the generally held belief that rate of rise detectors activate before fixed temperature detectors. This is not true when the detectors are located in areas with high ceilings and the fire does not grow rapidly. This example illustrates how quick and sometimes surprising comparisons may be made using the tabular form of the detector activation time results.

5.2 Example 3: Using the Computer Program

The last example will be used to show how the computer programs work. Both the BASIC version and the FORTRAN version ask similar questions and operate in a similar manner so this discussion is applicable to both programs. The problem will be to calculate the activation time for fixed temperature and rate of rise detectors installed, using a 3 meter spacing, in an area with a ceiling height of 4 meters. The detectors have an RTI of $370.3 \text{ (m-s)}^{1/2}$. The detector activation temperature is 54.4 degrees C, and the activation rate of rise is 8.33 degrees C/min. Ambient temperature is 21 degrees C. (User input is preceded by a > and, where possible, typed in lower case.)

ENTER 1 FOR ENGLISH UNIT INPUT
2 FOR METRIC UNIT INPUT

>2

ENTER THE AMBIENT TEMPERATURE IN DEGREES C.

>21

ENTER THE DETECTOR RESPONSE TIME INDEX (RTI) IN (M-SEC)**1/2.

>370.3

ENTER THE DETECTOR ACTIVATION TEMPERATURE IN DEGREES C.

>54.4

ENTER THE DETECTOR RATE OF RISE IN DEGREES C/MIN.

>8.33

ENTER THE CEILING HEIGHT IN METERS.

>4

ENTER THE DETECTOR SPACING IN METERS.

>3

ENTER: S FOR SLOW FIRE GROWTH RATE,
M FOR MEDIUM FIRE GROWTH RATE,
F FOR FAST FIRE GROWTH RATE,
U FOR ULTRAFAST FIRE GROWTH RATE, OR
O FOR OTHER.

>m

RESULTS:

CEILING HEIGHT = 4.00 METERS (13.12 FEET)
DETECTOR SPACING = 3.00 METERS (9.84 FEET)

DETECTOR RTI = 370.3 (M-SEC)**1/2 (670.7 (FT-SEC)**1/2)

FIRE GROWTH RATE CONSTANT = .1172E+002 JOULES/(SEC**3)
(.1111E-001 BTU/SEC**3)

FOR TEMPERATURE ACTUATED DETECTOR:

ACTIVATION TEMPERATURE = 54.4 DEGREES C (129.9 DEGREES F)

TIME OF ACTIVATION = 5.09 MINUTES

HEAT RELEASE RATE = .1094E+004 KILOJOULES/SEC
(.1037E+004 BTU/SEC)

FOR RATE OF RISE ACTUATED DETECTOR:

ACTIVATION RATE OF RISE = 8.33 DEGREES C/MIN
(14.99 DEGREES F/MIN)

TIME OF ACTIVATION = 3.15 MINUTES

HEAT RELEASE RATE = .4199E+003 KILOJOULES/SEC
(.3980E+003 BTU/SEC)

The results show that the fixed temperature heat detector would activate approximately 5 minutes after the fire reaches a flaming state. The heat release rate at this time would be 1094 kW. A rate of rise detector would activate at about 3 minutes with a corresponding heat release rate of 419.9 kW. (If English units had been selected, the input requests would have called for data in English units instead of metric units.)

6. SUMMARY

This report presented a methodology for evaluating heat detection systems installed in existing buildings. Previous work for use primarily in designing new systems was enhanced and supplemented to broaden its application. The resulting equations were programmed into a user interactive computer program. This program is available in both BASIC and FORTRAN and will run on mainframes as well as personal computers. In addition, a modified version of the FORTRAN program was used to develop an extensive set of tables listing detector activation times for given building geometries, detector characteristics, and fire growth rates. These tables are useful for quick evaluation of alternative heat detector installations among other uses. Practical examples were utilized to illustrate the use of the tables and computer programs.

7. REFERENCES

- [1] Alpert, R.L. "Calculation of Response Time of Ceiling - Mounted Fire Detectors", Fire Technology, 8, 1972, p. 181.
- [2] Alpert, R.L. "Turbulent Ceiling - Jet Induced by Large - Scale Fires", Combustion Science and Technology, 11, 1975, p. 197.
- [3] Heskestad, G. and Delichatsios, M.A. "Environments of Fire Detectors Phase I; Effects of Fire Size, Ceiling Height and Material, Volume II - Analysis", Technical Report Serial No. 22427, RC 77-T-11, Factory Mutual Research Corporation, Norwood, Massachusetts 02062, 1977.
- [4] Heskestad, G. and Delichatsios, M.A. "The Initial Convective Flow in Fire", Seventeenth Symposium (International) on Combustion, The Combustion Institute, Pittsburgh, Pennsylvania, 1978, pp. 1113 - 1123.
- [5] Schifiliti, Robert "Use of Fire Plume Theory in the Design and Analysis of Fire Detector and Sprinkler Response", MS thesis, Worcester Polytechnic Institute, 1985.

- [6] Standard on Automatic Fire Detectors, NFPA 72E - 1984, Appendix C, National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269.
- [7] Evans, D.D. and Stroup, D.W. "Methods of Calculating the Response Time of Heat and Smoke Detectors Installed Below Large Unobstructed Ceilings", NBSIR 85-3167, U.S. Department of Commerce, National Bureau of Standards, Gaithersburg, Maryland 20899, 1985.
- [8] Heskestad, G. and Smith, H. "Investigation of a New Sprinkler Sensitivity Approval Test: The Plunge Test", FMRC Technical Report 22485, Factory Mutual Research Corporation, Norwood, Massachusetts 02062, 1976.
- [9] Evans, D.D., Madrzykowski, D. "Characterizing the Thermal Response of Fusible-Link Sprinklers", NBSIR 81-2329, U.S. Department of Commerce, National Bureau of Standards, Gaithersburg, Maryland 20899, 1981.
- [10] Beyler, C.L. "A Design Method for Flaming Fire Detection", Fire Technology, 20, 4, 1984, p. 5.
- [11] Zukoski, E.E., Kubota, T., and Cetegen, B. "Entrainment in Fire Plumes", Fire Safety Journal, 3, 1980, pp. 107 - 121.
- [12] Burden, R.L., Faires, J.D., Reynolds, A.C. Numerical Analysis; Boston, Massachusetts; Prindle, Weber & Schmidt; 1981, pp. 600.
- [13] Stroup, D.W., Evans, D.D., and Martin, P. "Evaluating Thermal Fire Detection Systems [English Units]", NBS Special Publication 712, U.S. Department of Commerce, National Bureau of Standards, Gaithersburg, Maryland 20899, 1986.

TABLE 1. WAREHOUSE MATERIALS*

	Time to Reach 1055 kW (sec)	Maximum Heat Release per Unit Floor Area (kW/m ²)	Classification (s - slow) (m - medium) (f - fast) (u - ultrafast)
1. Wood pallets, stack 1.5 ft high (6-12% moisture)	150-310	1249	m-f
2. Wood pallets, stack 5 ft high (6-12% moisture)	90-190	3748	f
3. Wood pallets, stack 10 ft high (6-12% moisture)	80-110	6814	f
4. Wood pallets, stack 16 ft high (6-12% moisture)	75-105	10221	f
5. Mail bags, filled, stored 5 ft high	190	397	f
6. Cartons, compart- mented, stacked 15 ft high	60	2271	u
7. Paper, vertical rolls, stacked 20 ft high	15-28	-	-
8. Cotton (also PE, PE/Cot, Acrylic/ Nylon/PE), gar- ments in 12 ft high rack	20-42	-	-
9. Cartons on pallets rack storage, 15-30 ft high	40-280	-	m-f

* Adapted from Table C-2-2.2.1(a) of Ref. 5

TABLE 1. WAREHOUSE MATERIALS (continued)

	Time to Reach 1055 kW (sec)	Maximum Heat Release per Unit Floor Area (kW/m²)	Classification (s - slow) (m - medium) (f - fast) (u - ultrafast)
10. Paper products, densely packed in cartons, rack storage, 20 ft high	470	-	m-s
11. PE letter trays, filled, stacked 5 ft high on cart	190	8517	f
12. PE trash barrels in cartons stacked 15 ft high	55	2839	u
13. FRP shower stalls in cartons, stacked 15 ft high	85	1249	u
14. PE bottles packed in Item 6	85	6246	u
15. PE bottles in car- tons, stacked 15 ft high	75	1931	u
16. PE pallets, stack 3 ft high	130	-	f
17. PE pallets, stack 6-8 ft high	30-55	-	-
18. PU mattress, single, horizontal	110	-	f
19. PF insulation board, rigid foam, stacked 15 ft high	8	1931	-
20. PS jars packed in Item 6	55	13628	-

TABLE 1. WAREHOUSE MATERIALS (continued)

	Time to Reach 1055 kW (sec)	Maximum Heat Release per Unit Floor Area (kW/m²)	Classification (s - slow) (m - medium) (f - fast) (u - ultrafast)
21. PS tubs nested in cartons, stacked 14 ft high	105	5110	f
22. PS toy parts in car- tons, stacked 15 ft high	110	2044	f
23. PS insulation board, rigid, stacked 14 ft high	7	3293	-
24. PVC bottles packed in Item 6	9	3407	-
25. PP tubs packed in Item 6	10	4429	-
26. PP and PE film in rolls, stacked 14 ft high	40	3975	-
27. Distilled spirits in barrels, stacked 20 ft high	23-40	-	-
28. Methyl alcohol	-	738	-
29. Gasoline	-	2271	-
30. Kerosine	-	2271	-
31. Diesel Oil	-	2044	-

Abbreviations:

FRP - Fire Retardant Plastic
PE - Polyethylene
PF - Phenolic Resins
PP - Polypropylene

PS	-	Polysytrene
PU	-	Polyurethane
PVC	-	Polyvinyl Chloride

TABLE 2. MAXIMUM HEAT RELEASE RATES FROM
FIRE DETECTION INSTITUTE ANALYSIS*

	Approximate Values kW
1. Medium wastebasket with milk cartons	105
2. Large barrel with milk cartons	148
3. Upholstered chair with polyurethane foam	369
4. Latex foam mattress (heat at room door)	1266
5. Furnished living room (heat at open door)	4220 - 8440

* Adapted from Table C-2-2.2.1(b) of Ref. 3

TABLE 3. RTI VALUES FOR ANY LISTED DETECTOR*
(FIXED TEMPERATURE TYPE) [(m-s)^{1/2}]

Listed Spacing (m)	UL Listed Activation Temperature						All FM Listed Temp.
	<u>53.3°C</u>	<u>57.2°C</u>	<u>62.8°C</u>	<u>71.1°C</u>	<u>76.7°C</u>	<u>91.1°C</u>	
3.05	494	408	324	241	198	120	241
4.57	309	235	193	136	110	56	136
6.10	204	167	130	87	64	21	87
7.63	153	124	96	59	40		59
9.15	117	99	75	45	27		45
12.20	88	71	51	22			
15.25	73	54	37				
21.35	45	30	11				

NOTE: These RTIs are based on an analysis of the Underwriters Laboratories and Factory Mutual listing test procedures. Plunge test (see Ref. 7) results performed on the detector to be used will give a more accurate response time index.

Abbreviations:

FM - Factory Mutual
 UL - Underwriters Laboratories Inc.

* Adapted from Table C-3-2.1.1 of Ref. 5

TABLE 4. RTI VALUES FOR ANY LISTED DETECTOR*
(RATE OF RISE TYPE) [(m-s)^{1/2}]

Listed Spacing (m)	UL Listed Activation Rate of Temp. Rise		
	<u>8.33°C/min</u>	<u>11.1°C/min</u>	<u>13.9°C/min</u>
3.05	1013	722	543
3.81	802	593	445
4.57	654	482	352
6.10	482	321	235
9.15	309	210	155
12.20	247	161	114
15.25	235	136	89

Abbreviation:

UL - Underwriters Laboratories Inc.

* Adapted from Ref. 3

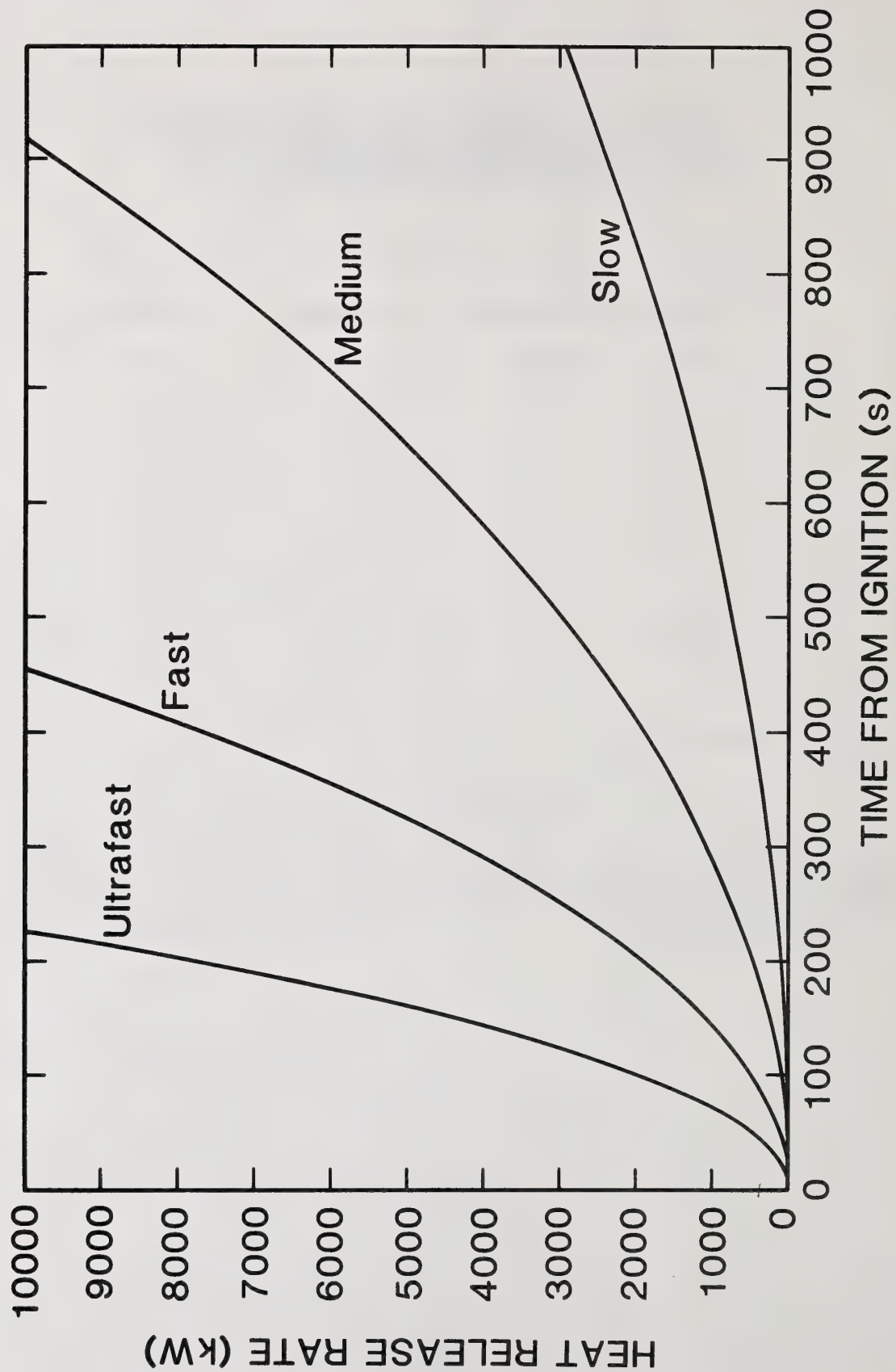


Figure 1. Plot of t^2 Fire Growth Curves

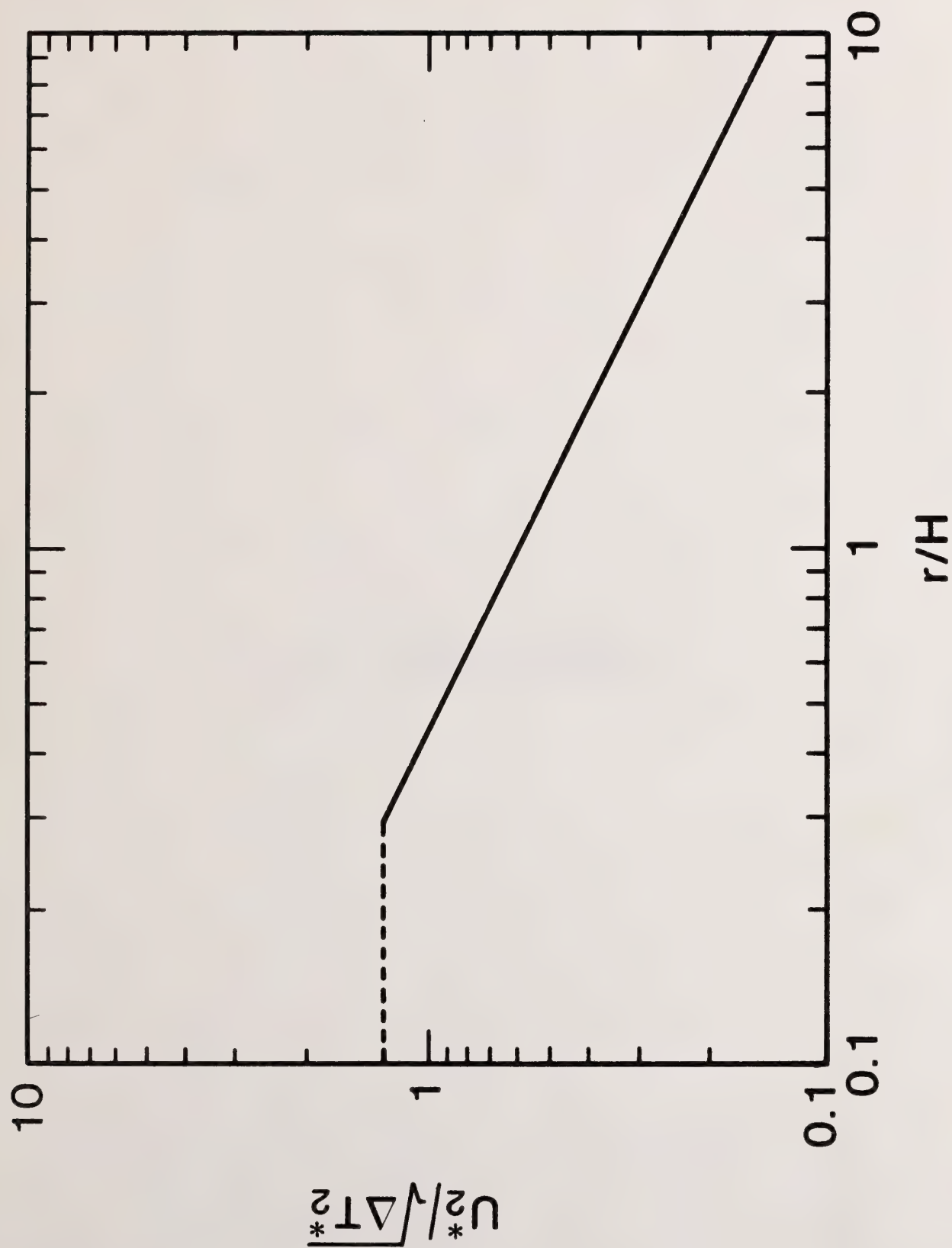


Figure 2. Plot of Dimensionless Velocity Correlation

This page intentionally left blank.

APPENDIX A. DETACT-T2
FORTTRAN VERSION


```

C
C      PROGRAM DETACT
C
C THIS IS PROGRAM DETACT-T2.
C IT CALCULATES THE RESPONSE OF THERMAL DETECTORS, BOTH FIXED TEMPERATURE
C AND RATE OF TEMPERATURE RISE, TO FIRES WHOSE HEAT RELEASE RATE GROWS
C PROPORTIONALLY WITH THE SQUARE OF TIME FROM IGNITION.
C
C WRITTEN BY DAVID W. STROUP, CENTER FOR FIRE RESEARCH, NBS
C
C THIS PROGRAM IS A CONTRIBUTION OF THE NATIONAL BUREAU OF STANDARDS AND
C IS NOT SUBJECT TO COPYRIGHT.
C
C VERSION 1.1
C
C ***** NOTATION *****
C
C INPUT:
C J      - UNITS CODE (1 OR 2)
C          1 - INPUT DATA IN ENGLISH UNITS
C          2 - INPUT DATA IN METRIC UNITS
C TAMB   - AMBIENT TEMPERATURE
C RTI    - DETECTOR RESPONSE TIME INDEX
C TACT   - DETECTOR ACTIVATION TEMPERATURE
C ROR    - DETECTOR ACTIVATION RATE OF RISE
C HF     - CEILING HEIGHT
C ZF     - DETECTOR SPACING
C M      - GROWTH FACTOR CODE, CHARACTER VARIABLE (S, M, F, U, OR O)
C ALPHA  - FIRE GROWTH RATE CONSTANT
C
C OUTPUT:
C T      - TIME OF ACTIVATION FOR FIXED TEMPERATURE DETECTOR
C QD     - HEAT RELEASE RATE AT TIME OF ACTIVATION, T
C TR     - TIME OF ACTIVATION FOR RATE OF RISE DETECTOR
C QDR    - HEAT RELEASE RATE AT TIME OF ACTIVATION, TR
C IERR   - ERROR CODE (0 OR 1)
C          0 - SUCCESSFUL
C          1 - UNSUCCESSFUL
C
C *****
C
C      IMPLICIT DOUBLE PRECISION (A-H,O-Z)
C      CHARACTER M
C      DATA IRTTY,IWTTY/5,6/
C      DATA GE,CPE,RHOE/32.2D0,0.24D0,0.0735D0/
C      DATA GM,CPM,RHOM/9.8D0,1.0035D0,1.1768D0/
C      IERR = 0
C      WRITE (IWTTY,1)
1  FORMAT (' DETACT-T2      VERSION 1.0'/
&         ' WRITTEN BY D.W. STROUP (1985)'//
&         ' CONTRIBUTION OF THE '/

```

```

&      ' NATIONAL BUREAU OF STANDARDS (U.S.).'//
&      ' NOT SUBJECT TO COPYRIGHT.'//
&      ' CALCULATES DETECTOR ACTUATION TIME'//
&      ' BELOW UNCONFINED CEILINGS WITH '/'
&      ' TIME SQUARED FIRE GROWTH RATES.'//)

C
C ENTER INPUT DATA
C
5      CONTINUE
      WRITE (IWTY,10)
10     FORMAT (' ENTER: 1 FOR ENGLISH UNIT INPUT'/8X,'2 FOR METRIC UNIT I
&NPUT'//)
      READ (IRTY,*) J
      IF (J.EQ.1) THEN
      WRITE (IWTY,20)
20     FORMAT (' ENTER THE AMBIENT TEMPERATURE IN DEGREES F.'//)
      READ (IRTY,*) TAMB
      WRITE (IWTY,30)
30     FORMAT (' ENTER THE DETECTOR RESPONSE TIME INDEX (RTI) IN (FT-SEC)
&*1/2.'//)
      READ (IRTY,*) RTI
      IF (RTI.LE.0.000001D0) RTI = 0.000001D0
      RTIR = RTI
      WRITE (IWTY,40)
40     FORMAT (' ENTER THE DETECTOR ACTIVATION TEMPERATURE IN DEGREES F.'
&/)
      READ (IRTY,*) TACT
      WRITE (IWTY,50)
50     FORMAT (' ENTER A DETECTOR RATE OF RISE IN DEGREES F/MINUTE.'//)
      READ (IRTY,*) ROR
      WRITE (IWTY,60)
60     FORMAT (' ENTER THE CEILING HEIGHT IN FEET.'//)
      READ (IRTY,*) HF
      WRITE (IWTY,70)
70     FORMAT (' ENTER THE DETECTOR SPACING IN FEET.'//)
      READ (IRTY,*) ZF
      WRITE (IWTY,80)
80     FORMAT (' ENTER: S FOR SLOW FIRE GROWTH RATE '/'
&      '      M FOR MEDIUM FIRE GROWTH RATE'//
&      '      F FOR FAST FIRE GROWTH RATE'//
&      '      U FOR ULTRAFAST FIRE GROWTH RATE OR'//
&      '      O FOR OTHER'//)
      READ (IRTY,410) M
      IF ((M.EQ.'s').OR.(M.EQ.'S')) ALPHA = 0.00277778D0
      IF ((M.EQ.'m').OR.(M.EQ.'M')) ALPHA = 0.01111111D0
      IF ((M.EQ.'f').OR.(M.EQ.'F')) ALPHA = 0.04444445D0
      IF ((M.EQ.'u').OR.(M.EQ.'U')) ALPHA = 0.17777778D0
      IF ((M.EQ.'o').OR.(M.EQ.'O')) WRITE (IWTY,90)
      IF ((M.EQ.'o').OR.(M.EQ.'O')) READ (IRTY,*) ALPHA
90     FORMAT (' ENTER THE FIRE GROWTH RATE CONSTANT (ALPHA) IN BTU/SEC/S
&EC/SEC.'//)
100    CONTINUE

```

```

        ELSE
C
C METRIC UNIT INPUT
C
        WRITE (IWTTY,110)
110    FORMAT (' ENTER THE AMBIENT TEMPERATURE IN DEGREES C. '/')
        READ (IRTTY,*) TAMB
        WRITE (IWTTY,120)
120    FORMAT (' ENTER THE DETECTOR RESPONSE TIME INDEX (RTI) IN (M-SEC)*
        &*1/2. '/')
        READ (IRTTY,*) RTI
        IF (RTI.LE.0.000001D0) RTI = 0.000001D0
        RTIR = RTI
        WRITE (IWTTY,130)
130    FORMAT (' ENTER THE DETECTOR ACTIVATION TEMPERATURE IN DEGREES C.'
        & '/')
        READ (IRTTY,*) TACT
        WRITE (IWTTY,140)
140    FORMAT (' ENTER A DETECTOR RATE OF RISE IN DEGREES C/MINUTE. '/')
        READ (IRTTY,*) ROR
        WRITE (IWTTY,150)
150    FORMAT (' ENTER THE CEILING HEIGHT IN METERS. '/')
        READ (IRTTY,*) HF
        WRITE (IWTTY,160)
160    FORMAT (' ENTER THE DETECTOR SPACING IN METERS. '/')
        READ (IRTTY,*) ZF
        WRITE (IWTTY,80)
        READ (IRTTY,410) M
        IF ((M.EQ.'s').OR.(M.EQ.'S')) ALPHA = 2.930555556D0
        IF ((M.EQ.'m').OR.(M.EQ.'M')) ALPHA = 11.72222222D0
        IF ((M.EQ.'f').OR.(M.EQ.'F')) ALPHA = 46.88888889D0
        IF ((M.EQ.'u').OR.(M.EQ.'U')) ALPHA = 187.5555556D0
        IF ((M.EQ.'o').OR.(M.EQ.'O')) WRITE (IWTTY,170)
        IF ((M.EQ.'o').OR.(M.EQ.'O')) READ (IRTTY,*) ALPHA
170    FORMAT (' ENTER THE FIRE GROWTH RATE CONSTANT (ALPHA) IN WATTS/SEC/
        &SEC. '/')
180    CONTINUE
        ENDIF
C
C ***** CALCULATIONS *****
C
        R = 0.5D0*DSQRT(2.0D0)*ZF
        ROH = R/HF
        ROR = ROR/60.D0
        IF (J.EQ.1) THEN
            TAMB = TAMB + 460.D0
            TACT = TACT + 460.D0
            A = GE/(CPE*TAMB*RHOE)
            G = GE
        ELSE
            TAMB = TAMB + 273.D0
            TACT = TACT + 273.D0

```



```

A = GM/(CPM*TAMB*RHOM*1000.D0)
G = GM
ENDIF
TOTS2 = A**(-1.D0/5.D0)*ALPHA**(-1.D0/5.D0)*HF**(4.D0/5.D0)
DLTODL = A**(2.D0/5.D0)*(TAMB/G)*ALPHA**(2.D0/5.D0)
&      *HF**(-3.D0/5.D0)
UOUS2 = A**(1.D0/5.D0)*ALPHA**(1.D0/5.D0)*HF**(1.D0/5.D0)
DELTD = TACT - TAMB
IF (ROH.GT.0.3D0) THEN
UODLTH = 0.59D0*ROH**(-0.63D0)
ELSE
UODLTH = 3.87D0/(9.115D0**0.5D0)
ENDIF
TS2F = 0.954D0*(1.D0+ROH)
A2 = (4.D0/3.D0)*DLTODL*UOUS2**(-0.5D0)*UODLTH**(-0.5D0)*RTI/
&      (TOTS2*(0.188D0+0.313D0*ROH))
C = 1.D0+DELTD/A2
CALL NWTN (C,Y,IERR,IWTTY)
IF (IERR.EQ.1) GO TO 380
DELTS2 = (4.D0/3.D0)*UOUS2**(-0.5D0)*UODLTH**(-0.5D0)*RTI*Y/
&      (TOTS2*(0.188D0+0.313D0*ROH))
TS2 = 0.954D0*(1.D0+ROH)+(0.188D0+0.313D0*ROH)*DELTS2**(3.D0/4.D0)
TS2 = TS2 + TS2F
T = TS2*A**(-1.D0/5.D0)*ALPHA**(-1.D0/5.D0)*HF**(4.D0/5.D0)
QD = ALPHA*T**2
IF (RTIR.LE.2.0D0) RTIR = 2.0D0
D1 = (4.D0/3.D0)*DLTODL/(TOTS2*(0.188D0+0.313D0*ROH))
D2 = (3.D0/4.D0)*UOUS2**0.5D0*UODLTH**0.5D0*(1.D0/RTIR)*TOTS2
&      *(0.188D0+0.313D0*ROH)
CALL BISECT (D1,D2,ROR,DELTS2,IERR,IWTTY)
IF (IERR.EQ.1) GO TO 380
TS2R = 0.954D0*(1.D0+ROH)+(0.188D0+0.313D0*ROH)*DELTS2
&      *(3.D0/4.D0)
TS2R = TS2R + TS2F
TR = TS2R*A**(-1.D0/5.D0)*ALPHA**(-1.D0/5.D0)*HF**(4.D0/5.D0)
QDR = ALPHA*TR**2

C
C ***** PRINT OUT RESULTS *****
C
      ROR = ROR*60.D0
      WRITE (IWTTY,190)
190   FORMAT ('1  RESULTS:')
      IF (J.EQ.1) THEN
C
C ENGLISH (METRIC) OUTPUT
C
      HF2 = HF * 0.3048D0
      ZF2 = ZF * 0.3048D0
      WRITE (IWTTY,200) HF,HF2,ZF,ZF2
200   FORMAT ('0  CEILING HEIGHT   = ',F6.2,' FEET (' ,F6.2,' METERS)'/
&      5X,'DETECTOR SPACING = ',F6.2,' FEET (' ,F6.2,' METERS)')
      RTI2 = RTI * (0.3048D0**0.5D0)

```

```

WRITE (IWTTY,210) RTI,RTI2
210  FORMAT ('0    DETECTOR RTI = ',F6.1,' (FT-SEC)**1/2 (' ,F6.1,' (M-S
&SEC)**1/2)')
    ALPHA2 = ALPHA * 1055.D0
    WRITE (IWTTY,220) ALPHA,ALPHA2
220  FORMAT ('0    FIRE GROWTH CONSTANT = ',E12.4,' BTU/(SEC**3)'/
&      '      (' ,E12.4,' JOULES/SEC**3)')
    WRITE (IWTTY,400)
    READ (IRTTY,410) M
    WRITE (IWTTY,230)
230  FORMAT (/ '0 FOR TEMPERATURE ACTUATED DETECTOR:')
    TACT = TACT - 460.D0
    TACT2 = (5.D0/9.D0)*(TACT-32.D0)
    WRITE (IWTTY,240) TACT,TACT2
240  FORMAT ('0    ACTIVATION TEMPERATURE = ',F6.1,' DEGREES F (' ,F6.1,
& ' DEGREES C)')
    T = T / 60.D0
    WRITE (IWTTY,250) T
250  FORMAT ('0    TIME TO ACTIVATION = ',F8.2,' MINUTES')
    QD2 = QD * 1.055D0
    WRITE (IWTTY,260) QD,QD2
260  FORMAT ('0    HEAT RELEASE RATE = ',E12.4,' BTU/SEC'/
&      '      (' ,E12.4,' KILOJOULES/SEC)')
    WRITE (IWTTY,400)
    READ (IRTTY,410) M
    WRITE (IWTTY,270)
270  FORMAT (// '0 FOR RATE OF RISE ACTUATED DETECTOR:')
    ROR2 = ROR * (5.D0/9.D0)
    WRITE (IWTTY,290) ROR,ROR2
290  FORMAT ('0    ACTIVATION RATE OF RISE = ',F6.2,' DEGREES F/MIN (' ,
&      F6.2,' DEGREES C/MIN)')
    TR = TR / 60.D0
    WRITE (IWTTY,250) TR
    QDR2 = QDR * 1.055D0
    WRITE (IWTTY,260) QDR,QDR2
    WRITE (IWTTY,400)
    READ (IRTTY,410) M
    ELSE

C
C METRIC (ENGLISH) OUTPUT
C
    HF2 = HF * (1.D0/0.3048D0)
    ZF2 = ZF * (1.D0/0.3048D0)
    WRITE (IWTTY,300) HF,HF2,ZF,ZF2
300  FORMAT ('0    CEILING HEIGHT = ',F6.2,' METERS (' ,F6.2,' FEET)'/
&      5X,'DETECTOR SPACING = ',F6.2,' METERS (' ,F6.2,' FEET)')
    RTI2 = RTI * ((1.D0/0.3048D0)**0.5D0)
    WRITE (IWTTY,320) RTI,RTI2
320  FORMAT ('0    DETECTOR RTI = ',F6.1,' (M-SEC)**1/2 (' ,F6.1,' (FT-S
&EC)**1/2)')
    ALPHA2 = ALPHA * (1.D0/1055.D0)
    WRITE (IWTTY,330) ALPHA,ALPHA2

```

```

330  FORMAT ('0    FIRE GROWTH CONSTANT = ',E12.4,' JOULES/(SEC**3)'/
&      '      (' ,E12.4,' BTU/SEC**3)')
      WRITE (IWTTY,400)
      READ (IRTTY,410) M
      WRITE (IWTTY,230)
      TACT = TACT - 273.D0
      TACT2 = (9.D0/5.D0) * TACT + 32.D0
      WRITE (IWTTY,340) TACT,TACT2
340  FORMAT ('0    ACTIVATION TEMPERATURE = ',F6.1,' DEGREES C (' ,F6.1,
&      ' DEGREES F)')
      T = T / 60.D0
      WRITE (IWTTY,350) T
350  FORMAT ('0    TIME TO ACTIVATION = ',F8.2,' MINUTES')
      QD = QD / 1000.D0
      QD2 = QD * (1.D0/1.055D0)
      WRITE (IWTTY,360) QD,QD2
360  FORMAT ('0    HEAT RELEASE RATE = ',E12.4,' KILOJOULES/SEC'/
&      '      (' ,E12.4,' BTU/SEC)')
      WRITE (IWTTY,400)
      READ (IRTTY,410) M
      WRITE (IWTTY,270)
      ROR2 = ROR * (9.D0/5.D0)
      WRITE (IWTTY,370) ROR,ROR2
370  FORMAT ('0    ACTIVATION RATE OF RISE = ',F6.2,' DEGREES C/MIN (' ,
&      ' F6.2,' DEGREES F/MIN)')
      TR = TR / 60.D0
      WRITE (IWTTY,350) TR
      QDR = QDR / 1000.D0
      QDR2 = QDR * (1.D0/1.055D0)
      WRITE (IWTTY,360) QDR,QDR2
      WRITE (IWTTY,400)
      READ (IRTTY,410) M
      ENDIF
      WRITE (IWTTY,420)
      READ (IRTTY,410) M
      IF ((M.EQ.'Y').OR.(M.EQ.'y')) GO TO 5
      STOP 'PROGRAM COMPLETED'
380  CONTINUE
      WRITE (IWTTY,390)
390  FORMAT (' *****> ERROR IN DETACT ROUTINE <*****')
400  FORMAT (// ' <RETURN> TO CONTINUE')
410  FORMAT (A1)
      WRITE (IWTTY,420)
420  FORMAT (' TRY ANOTHER CASE (Y/N) ?'/)
      READ (IRTTY,410) M
      IF ((M.EQ.'Y').OR.(M.EQ.'y')) GO TO 5
      STOP 'PROGRAM ABORTED'
      END

C
      SUBROUTINE NWTN (C,P,IERR,IWTTY)

C
C THIS IS ROUTINE NWTN. IT SOLVES THE FIXED TEMPERATURE DETECTOR

```


C ACTIVATION TIME EQUATION USING A NEWTON-RAPHSON METHOD.

C

```
      IMPLICIT DOUBLE PRECISION (A-H,O-Z)
      PO = 0.1D0
      TOL = 0.00001D0
      NO = 1000
      I = 1
      IERR = 0
10    CONTINUE
      IF (I.LE.NO) THEN
      IF (PO.GT.50.D0) THEN
      X = 0.0D0
      ELSE
      X = DEXP(-PO)
      ENDIF
      FX = PO + X - C
      FPMX = 1.0D0 - X
      IF (FPMX.LT.0.00000001D0) GO TO 30
      P = PO - (FX/FPMX)
      IF (ABS(P-PO).LT.TOL) THEN
      IERR = 0
      RETURN
      ELSE
      I = I + 1
      PO = P
      ENDIF
      GO TO 10
      ENDIF
      IERR = 1
      WRITE (IWTTY,20) I
20    FORMAT (' NEWTON-RAPHSON FAILED AFTER NO ITERATIONS, NO = ',I4)
      RETURN
30    WRITE (IWTTY,40)
40    FORMAT (' SLOPE OF EQUATION TOO CLOSE TO ZERO FOR '/
&    ' NEWTON-RAPHSON METHOD.'/
&    ' ERROR RETURN')
      IERR = 1
      RETURN
      END
```

C

SUBROUTINE BISECT (D1,D2,ROR,P,IERR,IWTTY)

C

C THIS IS ROUTINE BISECT. IT SOLVES THE RATE OF RISE DETECTOR ACTIVATION
C TIME EQUATION USING A BISECTION METHOD.

C

```
      IMPLICIT DOUBLE PRECISION (A-H,O-Z)
      IERR = 0
      TOL = 0.00001D0
      NO = 1000
      A = 0.0D0
      B = 1000.0D0
      RLMT = TOL / 20.0
```

```

10  CONTINUE
    IF ((D2*B).GT.50.D0) THEN
        X = 0.0D0
    ELSE
        X = DEXP (-D2*B)
    ENDIF
    FXB = D1*B**0.25D0-D1*B**0.25*X-ROR
    IF (FXB.LT.0.0D0) THEN
        A = B
        B = B + 500.D0
        GO TO 10
    ENDIF
    I = 1
20  CONTINUE
    IF (I.LE.NO) THEN
        P = A+(B-A)/2.0D0
        IF ((D2*P).GT.50.D0) THEN
            X = 0.0D0
        ELSE
            X = DEXP (-D2*P)
        ENDIF
        FX = D1*P**0.25D0-D1*P**0.25D0*X-ROR
        IF (((FX.GT.-RLMT).AND.(FX.LT.RLMT)).OR.
&      ((B-A)/2.D0).LT.TOL)) THEN
            IERR = 0
            RETURN
        ELSE
            I = I + 1
            IF ((D2*A).GT.50.D0) THEN
                X = 0.0D0
            ELSE
                X = DEXP (-D2*A)
            ENDIF
            FXA = D1*A**0.25D0-D1*A**0.25D0*X-ROR
            IF ((FXA*FX).GT.0.0D0) THEN
                A = P
            ELSE
                B = P
            ENDIF
        ENDIF
        GO TO 20
    ENDIF
    IERR = 1
    WRITE (IWTTY,30) I
30  FORMAT (' BISECTION ROUTINE FAILED AFTER NO ITERATIONS, NO = ',I4)
    RETURN
    END

```

This page intentionally left blank.

APPENDIX B. DETACT-T2
BASIC VERSION


```

10 PRINT "DETECT-T2  VERSION 2.0"
20 PRINT "WRITTEN BY D.W. STROUP  (1985)"
30 PRINT " "
40 PRINT "CONTRIBUTION OF THE"
50 PRINT "NATIONAL BUREAU OF STANDARDS (U.S.)."
60 PRINT "NOT SUBJECT TO COPYRIGHT. "
70 PRINT " "
80 PRINT "CALCULATES DETECTOR ACTUATION TIME"
90 PRINT "BELOW UNCONFINED CEILINGS WITH "
100 PRINT "TIME SQUARED FIRE GROWTH RATES "
110 PRINT " "
120 REM
130 REM INPUT:
140 REM J      - UNITS CODE (1 OR 2)
150 REM      1 - INPUT DATA IN ENGLISH UNITS
160 REM      2 - INPUT DATA IN METRIC  UNITS
170 REM TAMB   - AMBIENT TEMPERATURE
180 REM RTI    - DETECTOR RESPONSE TIME INDEX
190 REM TACT   - DETECTOR ACTIVATION TEMPERATURE
200 REM ROR    - DETECTOR ACTIVATION RATE OF RISE
210 REM HF     - CEILING HEIGHT
220 REM ZF     - DETECTOR SPACING
230 REM M      - GROWTH RATE FACTOR CODE, CHARACTER (S, M, F, U, OR O)
240 REM ALPHA  - FIRE GROWTH RATE CONSTANT (FOR M = O)
250 REM
260 REM OUTPUT:
270 REM T      - TIME OF ACTIVATION FOR FIXED TEMPERATURE DETECTOR
280 REM QD     - HEAT RELEASE RATE AT TIME OF ACTIVATION, T
290 REM TR     - TIME OF ACTIVATION FOR RATE OF RISE DETECTOR
300 REM QDR    - HEAT RELEASE RATE AT TIME OF ACTIVATION, TR
310 REM IERR   - ERROR CODE  (0 OR 1)
320 REM      0 - SUCCESSFUL
330 REM      1 - UNSUCCESSFUL
340 REM
350 CLEAR
360 REM
370 REM ENTER INPUT DATA
380 REM
390 READ GE#,CPE#,RHOE#
400 DATA 32.2#,0.24#,0.0735#
410 READ GM#,CPM#,RHOM#
420 DATA 9.8#,1.0035#,1.1768#
430 IERR% = 0
440 PRINT " ENTER: 1 FOR ENGLISH UNIT INPUT"
450 PRINT "          2 FOR METRIC  UNIT INPUT"
460 INPUT "SELECTION = ",J%
470 IF J%<>1 GOTO 740
480 REM
490 REM ENTER DATA IN ENGLISH UNITS
500 REM

```

```

510 INPUT "AMBIENT TEMPERATURE <DEGREES F> = ",TAMB#
520 INPUT "DETECTOR RESPONSE TIME INDEX, RTI <(FT-SEC)^(1/2)> = ",RTI#
530 IF RTI#<.0000001# THEN LET RTI# = .0000001#
540 RTIR# = RTI#
550 INPUT "DETECTOR ACTIVATION TEMPERATURE <DEGREES F> = ",TACT#
560 INPUT "DETECTOR RATE OF TEMPERATURE RISE <DEGREES F/MIN> = ",ROR#
570 INPUT "ROOM CEILING HEIGHT <FEET> = ",HF#
580 INPUT "DETECTOR SPACING <FEET> = ",ZF#
590 PRINT "ENTER: S FOR SLOW      FIRE GROWTH RATE,"
600 PRINT "      M FOR MEDIUM    FIRE GROWTH RATE,"
610 PRINT "      F FOR FAST        FIRE GROWTH RATE,"
620 PRINT "      U FOR ULTRAFAST    FIRE GROWTH RATE, OR"
630 PRINT "      O FOR OTHER      FIRE GROWTH RATE"
640 INPUT "SELECTION = ",M$
650 IF (M$="s" OR M$="S") THEN LET ALPHA# = .00277778#
660 IF (M$="m" OR M$="M") THEN LET ALPHA# = .01111111#
670 IF (M$="f" OR M$="F") THEN LET ALPHA# = .04444445#
680 IF (M$="u" OR M$="U") THEN LET ALPHA# = .17777778#
690 IF (M$="o" OR M$="O") THEN INPUT "FIRE GROWTH RATE <BTU/SEC^3> = ",ALPHA#
700 GOTO 940
710 REM
720 REM ENTER DATA IN METRIC UNITS
730 REM
740 INPUT "AMBIENT TEMPERATURE <DEGREES C> = ",TAMB#
750 INPUT "DETECTOR RESPONSE TIME INDEX, RTI <(M-SEC)^(1/2)> = ",RTI#
760 IF RTI#<.0000001# THEN LET RTI# = .0000001#
770 RTIR# = RTI#
780 INPUT "DETECTOR ACTIVATION TEMPERATURE <DEGREES C> = ",TACT#
790 INPUT "DETECTOR RATE OF TEMPERATURE RISE <DEGREES C/MIN> = ",ROR#
800 INPUT "ROOM CEILING HEIGHT <METERS> = ",HF#
810 INPUT "DETECTOR SPACING <METERS> = ",ZF#
820 PRINT "ENTER: S FOR SLOW      FIRE GROWTH RATE,"
830 PRINT "      M FOR MEDIUM    FIRE GROWTH RATE,"
840 PRINT "      F FOR FAST        FIRE GROWTH RATE,"
850 PRINT "      U FOR ULTRAFAST    FIRE GROWTH RATE, OR"
860 PRINT "      O FOR OTHER      FIRE GROWTH RATE"
870 INPUT "SELECTION = ",M$
880 IF (M$="s" OR M$="S") THEN LET ALPHA# = 2.9305556#
890 IF (M$="m" OR M$="M") THEN LET ALPHA# = 11.722222#
900 IF (M$="f" OR M$="F") THEN LET ALPHA# = 46.888889#
910 IF (M$="u" OR M$="U") THEN LET ALPHA# = 187.55556#
920 IF (M$="o" OR M$="O") THEN INPUT "FIRE GROWTH RATE <J/SEC^3> = ",ALPHA#
930 REM
940 REM ***** CALCULATIONS *****
950 REM
960 R# = .5# * SQR(2#) * ZF#
970 ROH# = R# / HF#
980 ROR# = ROR# / 60#
990 IF JZ<>1 GOTO 1050
1000 TAMB# = TAMB# + 460#
1010 TACT# = TACT# + 460#
1020 A# = GE#/(CPE#*TAMB#*RHOE#)

```

```

1030 G# = GE#
1040 GOTO 1090
1050 TAMB# = TAMB# + 273#
1060 TACT# = TACT# + 273#
1070 A# = GM#/(CPM#*TAMB#*RHOM#*1000#)
1080 G# = GM#
1090 TOTS2# = A#^(-1#/5#)*ALPHA#^(-1#/5#)*HF#^(4#/5#)
1100 DLTODL# = A#^(2#/5#)*(TAMB#/G#)*ALPHA#^(2#/5#)*HF#^(-3#/5#)
1110 UOUS2# = A#^(1#/5#)*ALPHA#^(1#/5#)*HF#^(1#/5#)
1120 DELTD# = TACT# - TAMB#
1130 IF (ROH#>.3) THEN UODLTH# = .59*ROH#^(-.63#) ELSE UODLTH# = 3.87#/(SQR(9.115#))
1140 TS2F# = .954# * (1# + ROH#)
1150 P# = TOTS2#*(.188#+.313#*ROH#)
1160 A2# = (4#/3#)*DLTODL#*UOUS2#^(-.5#)*UODLTH#^(-.5#)*RTI#/P#
1170 C# = 1# + DELTD# / A2#
1180 GOSUB 2650
1190 IF IERR%=1 GOTO 2550
1200 DELTS2# = (4#/3#)*UOUS2#^(-.5#)*UODLTH#^(-.5#)*RTI#*Y#/P#
1210 TS2# = .954#*(1#+ROH#)+(.188#+.313#*ROH#)*DELTS2#^(3#/4#)
1220 TS2# = TS2# + TS2F#
1230 T# = TS2#*A#^(-1#/5#)*ALPHA#^(-1#/5#)*HF#^(4#/5#)
1240 QD# = ALPHA# * T#^2!
1250 IF RTIR#<=2# THEN LET RTIR# = 2#
1260 D1# = (4#/3#)*DLTODL#/P#
1270 D2# = (3#/4#)*UOUS2#^.5#*UODLTH#^.5#*(1#/RTIR#)*P#
1280 GOSUB 2950
1290 IF IERR%=1 GOTO 2550
1300 TS2R# = .954#*(1#+ROH#)+(.188#+.313#*ROH#)*DELTS2#^(3#/4#)
1310 TS2R# = TS2R# + TS2F#
1320 TR# = TS2R#*A#^(-1#/5#)*ALPHA#^(-1#/5#)*HF#^(4#/5#)
1330 QDR# = ALPHA# * TR#^2!
1340 ROR# = ROR# * 60#
1350 REM
1360 REM PRINT OUT RESULTS
1370 REM
1380 PRINT "RESULTS:"
1390 IF JZ<>1 GOTO 1960
1400 REM
1410 REM ENGLISH (METRIC) OUTPUT
1420 REM
1430 HF2# = HF# * .3048
1440 ZF2# = ZF# * .3048
1450 PRINT " "
1460 PRINT " CEILING HEIGHT = ";CSNG(HF#);" FEET"
1470 PRINT " (";CSNG(HF2#);" METERS)"
1480 PRINT " "
1490 PRINT " DETECTOR SPACING = ";CSNG(ZF#);" FEET"
1500 PRINT " (";CSNG(ZF2#);" METERS)"
1510 PRINT " "
1520 RTI2# = RTI# * (.3048#^.5#)
1530 PRINT " RTI = ";CSNG(RTI#);" (FT-SEC)^0.5";" (";CSNG(RTI2#);" (M-SEC)^0.5)
1540 PRINT " "

```



```

1550 ALPHA2# = ALPHA# * 1055#
1560 PRINT " FIRE GROWTH RATE = ";CSNG(ALPHA#);" BTU/(SEC^3)"
1570 PRINT "                (";CSNG(ALPHA2#);" J/(SEC^3))"
1580 PRINT " "
1590 INPUT "<RETURN> TO CONTINUE ";O$
1600 PRINT " "
1610 PRINT " "
1620 PRINT " FOR TEMPERATURE ACTUATED DETECTOR:"
1630 TACT# = TACT# - 460#
1640 TACT2# = (5#/9#) * (TACT# - 32#)
1650 PRINT " "
1660 PRINT "  ACTIVATION TEMPERATURE = ";CSNG(TACT#);" DEGREES F"
1670 PRINT "                (";CSNG(TACT2#);" DEGREES C)"
1680 PRINT " "
1690 T# = T# / 60#
1700 PRINT "  TIME TO ACTIVATION = ";CSNG(T#);" MINUTES"
1710 PRINT " "
1720 QD2# = QD# * 1.055#
1730 PRINT "  HEAT RELEASE RATE = ";CSNG(QD#);" BTU/SEC"
1740 PRINT "                (";CSNG(QD2#);" kJ/SEC )"
1750 PRINT " "
1760 INPUT "<RETURN> TO CONTINUE ";O$
1770 PRINT " "
1780 PRINT " "
1790 PRINT " FOR RATE OF RISE ACTUATED DETECTOR:"
1800 ROR2# = ROR# * (5#/9#)
1810 PRINT " "
1820 PRINT "  ACTIVATION RATE OF RISE = ";CSNG(ROR#);" DEGREES F/MIN"
1830 PRINT "                (";CSNG(ROR2#);" DEGREES C/MIN)"
1840 PRINT " "
1850 TR# = TR# / 60#
1860 PRINT "  TIME TO ACTIVATION = ";CSNG(TR#);" MINUTES"
1870 QDR2# = QDR# * 1.055#
1880 PRINT " "
1890 PRINT "  HEAT RELEASE RATE = ";CSNG(QDR#);" BTU/SEC"
1900 PRINT "                (";CSNG(QDR2#);" kJ/SEC )"
1910 PRINT " "
1920 PRINT " "
1930 INPUT " TRY ANOTHER RUN (YES/NO) ";O$
1940 IF (O$="Y" OR O$="y") GOTO 120
1950 GOTO 2530
1960 HF2# = HF# * (1!/.3048)
1970 ZF2# = ZF# * (1!/.3048)
1980 REM
1990 REM METRIC (ENGLISH) OUTPUT
2000 REM
2010 PRINT " "
2020 PRINT " CEILING HEIGHT = ";CSNG(HF#);" METERS"
2030 PRINT "                (";CSNG(HF2#);" FEET)"
2040 PRINT " "
2050 PRINT " DETECTOR SPACING = ";CSNG(ZF#);" METERS"
2060 PRINT "                (";CSNG(ZF2#);" FEET)"

```



```

2070 PRINT " "
2080 RTI2# = RTI# * ((1!/.3048)^.5#)
2090 PRINT " RTI = ";CSNG(RTI#);" (M-SEC)^0.5";" (";CSNG(RTI2#);" (FT-SEC)^0.5)
2100 PRINT " "
2110 ALPHA2# = ALPHA# * (1!/1055!)
2120 PRINT " FIRE GROWTH RATE = ";CSNG(ALPHA#);" J/(SEC^3)"
2130 PRINT " (";CSNG(ALPHA2#);" BTU/(SEC^3))"
2140 PRINT " "
2150 INPUT "<RETURN> TO CONTINUE ";O$
2160 PRINT " "
2170 PRINT " "
2180 PRINT " FOR TEMPERATURE ACTUATED DETECTOR:"
2190 PRINT " "
2200 TACT# = TACT# - 273#
2210 TACT2# = (9#/5#) * TACT# + 32#
2220 PRINT " ACTIVATION TEMPERATURE = ";CSNG(TACT#);" DEGREES C"
2230 PRINT " (";CSNG(TACT2#);" DEGREES F)"
2240 PRINT " "
2250 T# = T# / 60#
2260 PRINT " TIME TO ACTIVATION = ";CSNG(T#);" MINUTES"
2270 PRINT " "
2280 QD# = QD# / 1000#
2290 QD2# = QD# * (1!/1.055)
2300 PRINT " HEAT RELEASE RATE = ";CSNG(QD#);" kJ/SEC"
2310 PRINT " (";CSNG(QD2#);" BTU/SEC )"
2320 PRINT " "
2330 INPUT "<RETURN> TO CONTINUE";O$
2340 PRINT " "
2350 PRINT " "
2360 PRINT " FOR RATE OF RISE ACTUATED DETECTOR:"
2370 ROR2# = ROR# * (9#/5#)
2380 PRINT " "
2390 PRINT " ACTIVATION RATE OF RISE = ";CSNG(ROR#);" DEGREES C/MIN"
2400 PRINT " (";CSNG(ROR2#);" DEGREES F/MIN)"
2410 PRINT " "
2420 TR# = TR# / 60#
2430 PRINT " TIME TO ACTIVATION = ";CSNG(TR#);" MINUTES"
2440 PRINT " "
2450 QDR# = QDR# / 1000#
2460 QDR2# = QDR# * (1!/1.055)
2470 PRINT " HEAT RELEASE RATE = ";CSNG(QDR#);" kJ/SEC"
2480 PRINT " (";CSNG(QDR2#);" BTU/SEC )"
2490 PRINT " "
2500 PRINT " "
2510 INPUT " TRY ANOTHER RUN (YES/NO) ";O$
2520 IF (O$="Y" OR O$="y") GOTO 120
2530 END
2540 REM
2550 REM ***** ERROR HANDLING ROUTINE *****
2560 REM
2570 PRINT " "
2580 PRINT " !!!!! ERROR IN DETACT-T2 ROUTINE !!!!!"

```

```

2590 PRINT " !!!!! PROGRAM RUN ABORTED          !!!!!"
2600 PRINT " "
2610 INPUT " WOULD YOU LIKE TO TRY AGAIN (YES/NO) ?";O$
2620 IF (O$="Y" OR O$="y") GOTO 120
2630 END
2640 REM
2650 REM ** NEWTON RAPHSON ROUTINE TO FIND ACTIVATION **
2660 REM ** TIME OF FIXED TEMPERATURE DETECTOR.      **
2670 REM
2680 P0# = .1#
2690 TOL# = .00001#
2700 NO% = 1000
2710 I% = 1
2720 IERR% = 0
2730 REM
2740 IF I%>NO% GOTO 2870
2750 IF (P0#>50#) THEN LET X#=0# ELSE X#=EXP(-P0#)
2760 FX#=P0# + X# - C#
2770 FPMX# = 1# - X#
2780 IF (FPMX#<.00000001#) GOTO 2900
2790 P2# = P0# - (FX#/FPMX#)
2800 IF (ABS(P0#-P2#)>TOL#) GOTO 2840
2810 IERR% = 0
2820 Y# = P2#
2830 RETURN
2840 I% = I% + 1
2850 P0# = P2#
2860 GOTO 2730
2870 IERR% = 1
2880 PRINT "NEWTON RAPHSON FAILED AFTER NO ITERATIONS, NO = ",I%
2890 RETURN
2900 PRINT "SLOPE OF EQUATION TOO CLOSE TO ZERO!!!"
2910 PRINT "ERROR IN NEWTON RAPHSON ROUTINE"
2920 IERR% = 1
2930 RETURN
2940 REM
2950 REM ** BISECTION ROUTINE TO FIND ACTIVATION **
2960 REM ** TIME OF RATE OF RISE DETECTOR.          **
2970 REM
2980 IERR% = 0
2990 TOL# = .00001#
3000 NO% = 1000
3010 AA# = 0#
3020 B# = 1000#
3030 RLMT# = TOL# / 20#
3040 REM
3050 IF (D2#*B#)>50# THEN X# = 0# ELSE X# = EXP(-D2#*B#)
3060 FXB# = D1# * B# ^ .25# - D1# * B# ^ .25# * X# - ROR#
3070 IF FXB#>=0# GOTO 3110
3080 AA# = B#
3090 B# = B# + 500#
3100 GOTO 3040

```

```

3110 I% = 1
3120 REM
3130 IF I>N0 GOTO 3260
3140 P3# = AA# + (B# - AA#) / 2#
3150 IF (D2#*P3#)>50# THEN X# = 0# ELSE X# = EXP (-D2#*P3#)
3160 FX# = D1# * P3# ^ .25# - D1# * P3# ^ .25# * X# - ROR#
3170 DELTS2# = P3#
3180 IF ((FX#>(-RLMT#)) AND (FX#<RLMT#)) THEN RETURN
3190 IF ((B#-AA#)/2#)<TOL# THEN RETURN
3200 REM
3210 I% = I% + 1
3220 IF (D2#*AA#)>50# THEN X# = 0# ELSE X# = EXP(-D2#*AA#)
3230 FXA# = D1# * AA# ^ .25# - D1# * AA# ^ .25# * X# - ROR#
3240 IF (FXA#*FX#)>0# THEN AA# = P3# ELSE B# = P3#
3250 GOTO 3120
3260 IERR% = 1
3270 PRINT "BISECTION ALGORITHM FAILED TO CONVERGE AFTER ",I%," ITERATIONS."
3280 RETURN

```

APPENDIX C.

DETECTOR ACTIVATION TIME TABLES:
FIXED TEMPERATURE

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 m (RADIUS = 0.0 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m												
		1	2	4	5	6	7	9	10	12	18	24		
(m*s) ^{1/2} 0	5	0.10*	0.18*	0.34*	0.41*	0.49*	0.56*	0.70*	0.77*	0.91*	1.33*	1.75*		
	10	0.11*	0.20*	0.38*	0.47*	0.56*	0.65*	0.82*	0.91*	1.08*	1.62*	2.16*		
	20	0.12*	0.23*	0.45*	0.57*	0.68*	0.79*	1.02*	1.14*	1.37*	2.09*	2.84*		
	30	0.13*	0.26*	0.52*	0.65*	0.78*	0.92*	1.20*	1.34*	1.62*	2.51*	3.44*		
	40	0.14*	0.29*	0.58*	0.73*	0.88*	1.04*	1.36*	1.52*	1.86*	2.90*	3.99*		
	60	0.16*	0.33*	0.68*	0.87*	1.06*	1.25*	1.66*	1.86*	2.28*	3.60*	5.00*		
	70	0.17*	0.35*	0.73*	0.94*	1.14*	1.36*	1.79*	2.02*	2.48*	3.93*	5.47*		
	80	0.18*	0.37*	0.78*	1.00*	1.22*	1.45*	1.93*	2.17*	2.67*	4.25*	5.93*		
10	5	0.14*	0.24*	0.42*	0.50*	0.58*	0.66*	0.80*	0.88*	1.02*	1.44*	1.85*		
	10	0.16*	0.27*	0.47*	0.56*	0.66*	0.74*	0.92*	1.01*	1.18*	1.71*	2.24*		
	20	0.18*	0.31*	0.55*	0.66*	0.77*	0.89*	1.11*	1.23*	1.46*	2.17*	2.91*		
	30	0.20*	0.34*	0.61*	0.74*	0.87*	1.01*	1.28*	1.42*	1.70*	2.58*	3.51*		
	40	0.21*	0.37*	0.67*	0.82*	0.97*	1.12*	1.44*	1.60*	1.93*	2.96*	4.05*		
	60	0.24*	0.42*	0.77*	0.95*	1.14*	1.33*	1.73*	1.93*	2.35*	3.66*	5.06*		
	70	0.25*	0.44*	0.82*	1.01*	1.22*	1.43*	1.86*	2.08*	2.54*	3.99*	5.53*		
	80	0.26*	0.46*	0.86*	1.08*	1.30*	1.52*	1.99*	2.23*	2.73*	4.30*	5.98*		
20	5	0.16*	0.27*	0.46*	0.54*	0.63*	0.71*	0.86*	0.94*	1.09*	1.52*	1.94*		
	10	0.18*	0.30*	0.52*	0.62*	0.71*	0.81*	0.99*	1.08*	1.26*	1.79*	2.33*		
	20	0.21*	0.35*	0.61*	0.73*	0.84*	0.96*	1.19*	1.31*	1.54*	2.25*	2.99*		
	30	0.23*	0.39*	0.67*	0.81*	0.95*	1.08*	1.36*	1.50*	1.78*	2.65*	3.57*		
	40	0.24*	0.42*	0.73*	0.89*	1.04*	1.20*	1.51*	1.67*	2.00*	3.03*	4.11*		
	60	0.27*	0.47*	0.84*	1.02*	1.21*	1.40*	1.80*	2.00*	2.41*	3.72*	5.11*		
	70	0.28*	0.49*	0.89*	1.09*	1.29*	1.50*	1.93*	2.15*	2.60*	4.05*	5.58*		
	80	0.30*	0.51*	0.93*	1.15*	1.37*	1.59*	2.06*	2.30*	2.79*	4.36*	6.03*		
50	5	0.18*	0.31*	0.52*	0.62*	0.72*	0.81*	0.98*	1.06*	1.23*	1.69*	2.14*		
	10	0.21*	0.36*	0.60*	0.72*	0.83*	0.93*	1.14*	1.23*	1.43*	1.99*	2.54*		
	20	0.25*	0.42*	0.71*	0.85*	0.98*	1.11*	1.36*	1.48*	1.73*	2.46*	3.19*		
	30	0.28*	0.47*	0.80*	0.95*	1.10*	1.25*	1.54*	1.69*	1.97*	2.85*	3.77*		
	40	0.30*	0.51*	0.87*	1.04*	1.21*	1.37*	1.70*	1.86*	2.20*	3.22*	4.30*		
	60	0.34*	0.57*	0.99*	1.19*	1.39*	1.59*	1.98*	2.19*	2.60*	3.90*	5.28*		
	70	0.35*	0.60*	1.04*	1.26*	1.47*	1.68*	2.12*	2.34*	2.79*	4.21*	5.74*		
	80	0.37*	0.63*	1.09*	1.32*	1.55*	1.78*	2.24*	2.48*	2.97*	4.52*	6.18*		
100	5	0.21*	0.35*	0.59*	0.70*	0.81*	0.91*	1.10*	1.19*	1.37*	1.88*	2.36*		
	10	0.25*	0.41*	0.69*	0.82*	0.94*	1.06*	1.29*	1.40*	1.61*	2.22*	2.81*		
	20	0.30*	0.49*	0.83*	0.98*	1.13*	1.27*	1.55*	1.69*	1.95*	2.72*	3.49*		
	30	0.33*	0.55*	0.93*	1.10*	1.27*	1.44*	1.76*	1.91*	2.22*	3.14*	4.06*		
	40	0.36*	0.60*	1.01*	1.21*	1.39*	1.57*	1.93*	2.11*	2.46*	3.51*	4.58*		
	60	0.41*	0.68*	1.16*	1.38*	1.60*	1.81*	2.23*	2.45*	2.87*	4.17*	5.55*		
	70	0.43*	0.71*	1.22*	1.45*	1.69*	1.91*	2.37*	2.60*	3.06*	4.49*	6.00*		
	80	0.44*	0.74*	1.27*	1.52*	1.77*	2.01*	2.50*	2.75*	3.24*	4.79*	6.44*		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 m (RADIUS = 0.0 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	0.23*	0.39*	0.64*	0.76*	0.87*	0.98*	1.19*	1.28*	1.48*	2.02*	2.52*
	10	0.27*	0.45*	0.76*	0.90*	1.03*	1.16*	1.40*	1.52*	1.74*	2.39*	3.01*
	20	0.33*	0.55*	0.91*	1.08*	1.24*	1.39*	1.69*	1.84*	2.12*	2.94*	3.73*
	30	0.37*	0.61*	1.03*	1.22*	1.40*	1.57*	1.92*	2.08*	2.41*	3.37*	4.32*
	40	0.40*	0.67*	1.12*	1.33*	1.53*	1.73*	2.11*	2.29*	2.66*	3.75*	4.84*
	60	0.45*	0.76*	1.28*	1.52*	1.75*	1.98*	2.43*	2.65*	3.09*	4.43*	5.80*
	70	0.48*	0.80*	1.35*	1.60*	1.85*	2.09*	2.57*	2.81*	3.29*	4.74*	6.25*
	80	0.50*	0.83*	1.41*	1.68*	1.94*	2.20*	2.71*	2.96*	3.47*	5.04*	6.69*
200	5	0.25*	0.41*	0.69*	0.81*	0.93*	1.04*	1.26*	1.36*	1.56*	2.13*	2.65*
	10	0.29*	0.49*	0.81*	0.96*	1.10*	1.23*	1.49*	1.61*	1.85*	2.53*	3.18*
	20	0.36*	0.59*	0.98*	1.16*	1.33*	1.49*	1.81*	1.96*	2.26*	3.11*	3.93*
	30	0.40*	0.66*	1.11*	1.31*	1.50*	1.69*	2.05*	2.22*	2.57*	3.56*	4.54*
	40	0.44*	0.72*	1.21*	1.43*	1.64*	1.85*	2.25*	2.45*	2.83*	3.96*	5.08*
	60	0.49*	0.82*	1.38*	1.63*	1.88*	2.12*	2.59*	2.82*	3.28*	4.65*	6.04*
	70	0.52*	0.86*	1.45*	1.72*	1.99*	2.24*	2.75*	2.99*	3.49*	4.97*	6.49*
	80	0.54*	0.90*	1.52*	1.80*	2.08*	2.35*	2.89*	3.15*	3.68*	5.27*	6.92*
250	5	0.26*	0.43*	0.72*	0.85*	0.97*	1.09*	1.32*	1.43*	1.63*	2.22*	2.77*
	10	0.31*	0.52*	0.86*	1.01*	1.16*	1.30*	1.57*	1.70*	1.95*	2.66*	3.32*
	20	0.38*	0.62*	1.04*	1.23*	1.40*	1.58*	1.91*	2.07*	2.38*	3.26*	4.11*
	30	0.43*	0.70*	1.17*	1.38*	1.59*	1.78*	2.16*	2.35*	2.70*	3.74*	4.74*
	40	0.47*	0.77*	1.28*	1.52*	1.74*	1.96*	2.38*	2.58*	2.98*	4.14*	5.29*
	60	0.53*	0.88*	1.46*	1.73*	1.99*	2.25*	2.74*	2.98*	3.45*	4.85*	6.27*
	70	0.56*	0.92*	1.54*	1.83*	2.10*	2.37*	2.89*	3.15*	3.66*	5.18*	6.71*
	80	0.58*	0.96*	1.61*	1.91*	2.21*	2.49*	3.04*	3.32*	3.86*	5.48*	7.15*
300	5	0.27*	0.45*	0.75*	0.89*	1.01*	1.14*	1.37*	1.48*	1.70*	2.31*	2.87*
	10	0.33*	0.54*	0.90*	1.06*	1.21*	1.36*	1.64*	1.77*	2.03*	2.76*	3.45*
	20	0.40*	0.66*	1.09*	1.29*	1.47*	1.65*	2.00*	2.16*	2.48*	3.40*	4.27*
	30	0.45*	0.74*	1.23*	1.45*	1.67*	1.87*	2.26*	2.45*	2.83*	3.89*	4.92*
	40	0.49*	0.81*	1.35*	1.59*	1.83*	2.05*	2.49*	2.70*	3.11*	4.31*	5.48*
	60	0.56*	0.92*	1.54*	1.82*	2.09*	2.35*	2.86*	3.11*	3.60*	5.04*	6.47*
	70	0.59*	0.97*	1.62*	1.92*	2.21*	2.49*	3.03*	3.29*	3.82*	5.37*	6.93*
	80	0.61*	1.02*	1.70*	2.01*	2.31*	2.61*	3.18*	3.46*	4.02*	5.68*	7.36*
400	5	0.29*	0.48*	0.80*	0.95*	1.08*	1.21*	1.46*	1.58*	1.81*	2.45*	3.05*
	10	0.35*	0.58*	0.97*	1.14*	1.30*	1.46*	1.75*	1.90*	2.17*	2.95*	3.68*
	20	0.43*	0.71*	1.18*	1.39*	1.59*	1.78*	2.15*	2.32*	2.67*	3.64*	4.56*
	30	0.49*	0.81*	1.33*	1.57*	1.80*	2.02*	2.44*	2.64*	3.04*	4.16*	5.24*
	40	0.54*	0.88*	1.46*	1.72*	1.98*	2.22*	2.68*	2.91*	3.35*	4.61*	5.83*
	60	0.61*	1.01*	1.67*	1.97*	2.26*	2.54*	3.09*	3.35*	3.87*	5.37*	6.85*
	70	0.64*	1.06*	1.76*	2.08*	2.39*	2.69*	3.26*	3.54*	4.10*	5.71*	7.31*
	80	0.67*	1.11*	1.84*	2.18*	2.50*	2.82*	3.43*	3.72*	4.31*	6.03*	7.75*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 m (RADIUS = 0.0 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE
 TIME INDEX

TEMPERATURE
 RISE

(m*s)^{1/2}

°C

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

41

42

43

44

45

46

47

48

49

50

51

52

53

54

55

56

57

58

59

60

61

62

63

64

65

66

67

68

69

70

71

72

73

74

75

76

77

78

79

80

81

82

83

84

85

86

87

88

89

90

91

92

93

94

95

96

97

98

99

100

101

102

103

104

105

106

107

108

109

110

111

112

113

114

115

116

117

118

119

120

121

122

123

124

125

126

127

128

129

130

131

132

133

134

135

136

137

138

139

140

141

142

143

144

145

146

147

148

149

150

151

152

153

154

155

156

157

158

159

160

161

162

163

164

165

166

167

168

169

170

171

172

173

174

175

176

177

178

179

180

181

182

183

184

185

186

187

188

189

190

191

192

193

194

195

196

197

198

199

200

201

202

203

204

205

206

207

208

209

210

211

212

213

214

215

216

217

218

219

220

221

222

223

224

225

226

227

228

229

230

231

232

233

234

235

236

237

238

239

240

241

242

243

244

245

246

247

248

249

250

251

252

253

254

255

256

257

258

259

260

261

262

263

264

265

266

267

268

269

270

271

272

273

274

275

276

277

278

279

280

281

282

283

284

285

286

287

288

289

290

291

292

293

294

295

296

297

298

299

300

301

302

303

304

305

306

307

308

309

310

311

312

313

314

315

316

317

318

319

320

321

322

323

324

325

326

327

328

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 m (RADIUS = 0.0 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	0.34*	0.56*	0.94*	1.11*	1.27*	1.43*	1.73*	1.88*	2.16*	2.97*	3.73*
	10	0.40*	0.67*	1.12*	1.33*	1.52*	1.71*	2.08*	2.26*	2.61*	3.61*	4.58*
	20	0.49*	0.81*	1.37*	1.62*	1.87*	2.11*	2.57*	2.80*	3.25*	4.58*	5.91*
	30	0.55*	0.92*	1.56*	1.85*	2.13*	2.41*	2.96*	3.23*	3.76*	5.38*	7.05*
	40	0.60*	1.01*	1.71*	2.04*	2.36*	2.67*	3.29*	3.60*	4.22*	6.11*	8.10*
	60	0.69*	1.15*	1.97*	2.36*	2.74*	3.12*	3.88*	4.26*	5.03*	7.45*	10.04*
	70	0.72*	1.22*	2.09*	2.50*	2.91*	3.32*	4.15*	4.56*	5.41*	8.08*	10.95*
	80	0.76*	1.28*	2.20*	2.64*	3.08*	3.51*	4.40*	4.85*	5.77*	8.69*	11.84*
200	5	0.36*	0.60*	1.00*	1.18*	1.36*	1.52*	1.84*	1.99*	2.29*	3.13*	3.93*
	10	0.43*	0.72*	1.20*	1.42*	1.63*	1.83*	2.22*	2.41*	2.77*	3.82*	4.83*
	20	0.53*	0.88*	1.47*	1.74*	2.00*	2.26*	2.75*	2.98*	3.45*	4.83*	6.19*
	30	0.60*	1.00*	1.67*	1.99*	2.29*	2.58*	3.15*	3.43*	3.99*	5.65*	7.34*
	40	0.66*	1.09*	1.84*	2.19*	2.53*	2.86*	3.50*	3.82*	4.46*	6.39*	8.38*
	60	0.75*	1.25*	2.12*	2.53*	2.93*	3.33*	4.11*	4.50*	5.29*	7.73*	10.31*
	70	0.79*	1.32*	2.25*	2.68*	3.11*	3.54*	4.38*	4.81*	5.67*	8.35*	11.21*
	80	0.83*	1.38*	2.36*	2.82*	3.28*	3.73*	4.64*	5.10*	6.03*	8.96*	12.09*
250	5	0.38*	0.63*	1.06*	1.25*	1.43*	1.60*	1.93*	2.09*	2.40*	3.28*	4.10*
	10	0.46*	0.76*	1.27*	1.50*	1.72*	1.93*	2.34*	2.53*	2.91*	4.00*	5.04*
	20	0.57*	0.94*	1.56*	1.85*	2.12*	2.38*	2.89*	3.14*	3.63*	5.05*	6.44*
	30	0.64*	1.06*	1.78*	2.10*	2.42*	2.73*	3.32*	3.61*	4.19*	5.89*	7.60*
	40	0.70*	1.16*	1.96*	2.32*	2.67*	3.02*	3.69*	4.02*	4.67*	6.64*	8.65*
	60	0.80*	1.33*	2.25*	2.68*	3.10*	3.51*	4.32*	4.72*	5.52*	7.98*	10.57*
	70	0.84*	1.41*	2.38*	2.84*	3.28*	3.72*	4.60*	5.03*	5.91*	8.61*	11.47*
	80	0.88*	1.47*	2.50*	2.99*	3.46*	3.93*	4.86*	5.33*	6.27*	9.21*	12.34*
300	5	0.40*	0.66*	1.10*	1.30*	1.49*	1.67*	2.01*	2.18*	2.50*	3.41*	4.26*
	10	0.48*	0.80*	1.33*	1.57*	1.80*	2.02*	2.44*	2.64*	3.04*	4.16*	5.23*
	20	0.60*	0.98*	1.64*	1.94*	2.22*	2.50*	3.03*	3.28*	3.79*	5.25*	6.67*
	30	0.68*	1.12*	1.87*	2.21*	2.54*	2.86*	3.47*	3.78*	4.37*	6.11*	7.85*
	40	0.74*	1.23*	2.06*	2.44*	2.80*	3.16*	3.85*	4.19*	4.87*	6.87*	8.90*
	60	0.85*	1.41*	2.37*	2.81*	3.25*	3.67*	4.50*	4.91*	5.73*	8.23*	10.82*
	70	0.89*	1.48*	2.50*	2.98*	3.44*	3.89*	4.79*	5.24*	6.13*	8.86*	11.72*
	80	0.94*	1.56*	2.63*	3.13*	3.62*	4.11*	5.06*	5.54*	6.50*	9.46*	12.59*
400	5	0.43*	0.71*	1.18*	1.40*	1.60*	1.79*	2.16*	2.33*	2.67*	3.63*	4.52*
	10	0.53*	0.87*	1.44*	1.69*	1.94*	2.17*	2.62*	2.84*	3.26*	4.45*	5.57*
	20	0.65*	1.07*	1.78*	2.09*	2.40*	2.69*	3.26*	3.53*	4.07*	5.60*	7.08*
	30	0.74*	1.22*	2.02*	2.39*	2.74*	3.08*	3.74*	4.06*	4.68*	6.50*	8.29*
	40	0.81*	1.34*	2.23*	2.64*	3.03*	3.41*	4.14*	4.50*	5.21*	7.29*	9.37*
	60	0.93*	1.53*	2.57*	3.04*	3.50*	3.95*	4.83*	5.26*	6.12*	8.68*	11.30*
	70	0.98*	1.62*	2.72*	3.22*	3.71*	4.19*	5.13*	5.60*	6.52*	9.31*	12.20*
	80	1.02*	1.70*	2.85*	3.39*	3.91*	4.42*	5.42*	5.91*	6.91*	9.92*	13.06*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 m (RADIUS = 0.0 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX
 TEMPERATURE RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
0	5	0.20*	0.38*	0.73*	0.91*	1.08*	1.26*	1.62*	1.80*	2.16*	3.26*	4.39*
	10	0.23*	0.45*	0.91*	1.14*	1.37*	1.61*	2.09*	2.34*	2.84*	4.40*	6.02*
	20	0.29*	0.58*	1.20*	1.52*	1.86*	2.20*	2.90*	3.26*	3.99*	6.31*	8.76*
	30	0.33*	0.68*	1.45*	1.86*	2.28*	2.71*	3.60*	4.06*	5.00*	7.98*	11.16*
	40	0.37*	0.78*	1.69*	2.17*	2.67*	3.18*	4.25*	4.80*	5.93*	9.52*	13.36*
	60	0.45*	0.96*	2.12*	2.74*	3.38*	4.05*	5.43*	6.15*	7.62*	12.34*	17.40*
	70	0.48*	1.05*	2.32*	3.00*	3.72*	4.45*	5.99*	6.78*	8.42*	13.65*	19.28*
	80	0.52*	1.13*	2.51*	3.26*	4.04*	4.84*	6.52*	7.39*	9.18*	14.92*	21.10*
10	5	0.29*	0.49*	0.86*	1.04*	1.22*	1.39*	1.74*	1.92*	2.28*	3.37*	4.50*
	10	0.33*	0.57*	1.03*	1.26*	1.49*	1.73*	2.20*	2.45*	2.94*	4.49*	6.11*
	20	0.39*	0.70*	1.31*	1.63*	1.96*	2.30*	2.99*	3.35*	4.08*	6.39*	8.83*
	30	0.44*	0.80*	1.56*	1.96*	2.37*	2.80*	3.69*	4.14*	5.08*	8.05*	11.22*
	40	0.48*	0.89*	1.78*	2.26*	2.76*	3.27*	4.33*	4.87*	6.00*	9.59*	13.42*
	60	0.56*	1.07*	2.20*	2.82*	3.46*	4.12*	5.50*	6.22*	7.69*	12.40*	17.45*
	70	0.59*	1.15*	2.40*	3.08*	3.79*	4.52*	6.05*	6.85*	8.48*	13.71*	19.34*
	80	0.62*	1.23*	2.59*	3.34*	4.11*	4.91*	6.59*	7.45*	9.24*	14.98*	21.15*
20	5	0.32*	0.55*	0.95*	1.13*	1.32*	1.50*	1.86*	2.03*	2.39*	3.48*	4.60*
	10	0.37*	0.64*	1.13*	1.36*	1.60*	1.83*	2.31*	2.55*	3.04*	4.58*	6.20*
	20	0.45*	0.78*	1.41*	1.73*	2.06*	2.39*	3.08*	3.44*	4.16*	6.46*	8.91*
	30	0.50*	0.89*	1.65*	2.05*	2.46*	2.89*	3.77*	4.22*	5.16*	8.12*	11.29*
	40	0.55*	0.98*	1.88*	2.35*	2.84*	3.35*	4.40*	4.95*	6.07*	9.65*	13.48*
	60	0.63*	1.16*	2.29*	2.90*	3.54*	4.20*	5.57*	6.29*	7.76*	12.46*	17.51*
	70	0.67*	1.24*	2.48*	3.16*	3.87*	4.60*	6.12*	6.91*	8.54*	13.77*	19.39*
	80	0.70*	1.31*	2.67*	3.41*	4.18*	4.98*	6.65*	7.52*	9.30*	15.03*	21.21*
50	5	0.38*	0.65*	1.10*	1.31*	1.51*	1.71*	2.10*	2.29*	2.66*	3.77*	4.89*
	10	0.45*	0.77*	1.32*	1.58*	1.83*	2.08*	2.58*	2.82*	3.32*	4.85*	6.45*
	20	0.55*	0.94*	1.64*	1.97*	2.31*	2.65*	3.34*	3.70*	4.42*	6.70*	9.12*
	30	0.62*	1.07*	1.89*	2.30*	2.72*	3.14*	4.01*	4.46*	5.39*	8.34*	11.49*
	40	0.68*	1.18*	2.12*	2.60*	3.09*	3.59*	4.64*	5.18*	6.29*	9.85*	13.67*
	60	0.78*	1.37*	2.53*	3.14*	3.77*	4.42*	5.78*	6.49*	7.95*	12.63*	17.68*
	70	0.82*	1.45*	2.72*	3.39*	4.09*	4.81*	6.33*	7.11*	8.73*	13.94*	19.55*
	80	0.86*	1.53*	2.90*	3.64*	4.40*	5.19*	6.85*	7.71*	9.49*	15.20*	21.36*
100	5	0.45*	0.75*	1.26*	1.50*	1.72*	1.94*	2.37*	2.57*	2.98*	4.15*	5.31*
	10	0.54*	0.90*	1.53*	1.81*	2.09*	2.37*	2.90*	3.17*	3.69*	5.26*	6.86*
	20	0.66*	1.10*	1.89*	2.26*	2.63*	2.99*	3.71*	4.07*	4.80*	7.07*	9.48*
	30	0.75*	1.26*	2.18*	2.62*	3.06*	3.50*	4.38*	4.84*	5.76*	8.68*	11.82*
	40	0.82*	1.39*	2.42*	2.93*	3.44*	3.95*	5.00*	5.54*	6.64*	10.18*	13.97*
	60	0.94*	1.61*	2.85*	3.48*	4.12*	4.77*	6.13*	6.83*	8.28*	12.93*	17.95*
	70	0.99*	1.70*	3.05*	3.74*	4.44*	5.16*	6.66*	7.44*	9.05*	14.23*	19.82*
	80	1.04*	1.79*	3.24*	3.98*	4.74*	5.53*	7.17*	8.03*	9.79*	15.48*	21.62*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 m (RADIUS = 0.0 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 (m*s) ^{1/2}	5	0.49*	0.82*	1.38*	1.64*	1.88*	2.11*	2.57*	2.79*	3.21*	4.45*	5.65*	
	10	0.60*	1.00*	1.68*	1.99*	2.29*	2.58*	3.15*	3.43*	3.98*	5.60*	7.23*	
	20	0.73*	1.23*	2.08*	2.48*	2.87*	3.25*	4.01*	4.38*	5.13*	7.43*	9.83*	
	30	0.83*	1.40*	2.39*	2.86*	3.33*	3.78*	4.70*	5.16*	6.10*	9.02*	12.14*	
	40	0.92*	1.54*	2.66*	3.19*	3.72*	4.25*	5.32*	5.87*	6.98*	10.50*	14.28*	
	60	1.05*	1.78*	3.12*	3.77*	4.42*	5.09*	6.45*	7.15*	8.59*	13.22*	18.23*	
	70	1.11*	1.89*	3.32*	4.03*	4.74*	5.47*	6.98*	7.75*	9.36*	14.51*	20.08*	
	80	1.16*	1.99*	3.51*	4.28*	5.05*	5.84*	7.48*	8.34*	10.09*	15.75*	21.88*	
200	5	0.53*	0.88*	1.48*	1.75*	2.00*	2.25*	2.73*	2.96*	3.41*	4.70*	5.94*	
	10	0.65*	1.07*	1.80*	2.13*	2.45*	2.76*	3.36*	3.65*	4.22*	5.90*	7.56*	
	20	0.80*	1.33*	2.24*	2.66*	3.07*	3.47*	4.26*	4.64*	5.42*	7.75*	10.17*	
	30	0.91*	1.51*	2.57*	3.07*	3.55*	4.03*	4.98*	5.45*	6.40*	9.35*	12.46*	
	40	1.00*	1.67*	2.85*	3.42*	3.97*	4.52*	5.61*	6.17*	7.29*	10.81*	14.58*	
	60	1.15*	1.93*	3.34*	4.01*	4.69*	5.37*	6.75*	7.46*	8.90*	13.52*	18.50*	
	70	1.21*	2.04*	3.55*	4.28*	5.02*	5.76*	7.28*	8.05*	9.66*	14.79*	20.35*	
	80	1.27*	2.15*	3.75*	4.54*	5.33*	6.13*	7.78*	8.63*	10.39*	16.03*	22.13*	
250	5	0.56*	0.94*	1.56*	1.84*	2.11*	2.37*	2.87*	3.11*	3.58*	4.92*	6.19*	
	10	0.69*	1.14*	1.90*	2.25*	2.59*	2.91*	3.53*	3.84*	4.43*	6.16*	7.86*	
	20	0.85*	1.41*	2.37*	2.81*	3.24*	3.66*	4.48*	4.88*	5.67*	8.05*	10.48*	
	30	0.97*	1.61*	2.73*	3.24*	3.75*	4.24*	5.22*	5.71*	6.68*	9.65*	12.77*	
	40	1.07*	1.78*	3.02*	3.61*	4.18*	4.75*	5.87*	6.44*	7.58*	11.11*	14.87*	
	60	1.23*	2.06*	3.53*	4.23*	4.93*	5.62*	7.03*	7.74*	9.19*	13.80*	18.77*	
	70	1.29*	2.17*	3.75*	4.51*	5.26*	6.02*	7.56*	8.34*	9.95*	15.07*	20.61*	
	80	1.36*	2.29*	3.96*	4.77*	5.58*	6.40*	8.06*	8.92*	10.67*	16.30*	22.39*	
300	5	0.59*	0.98*	1.63*	1.93*	2.21*	2.48*	2.99*	3.24*	3.73*	5.11*	6.42*	
	10	0.72*	1.20*	2.00*	2.36*	2.71*	3.04*	3.69*	4.00*	4.62*	6.40*	8.13*	
	20	0.90*	1.49*	2.49*	2.95*	3.40*	3.83*	4.67*	5.09*	5.90*	8.33*	10.79*	
	30	1.02*	1.70*	2.86*	3.40*	3.92*	4.44*	5.44*	5.94*	6.93*	9.94*	13.07*	
	40	1.13*	1.88*	3.18*	3.78*	4.37*	4.96*	6.11*	6.69*	7.84*	11.41*	15.16*	
	60	1.30*	2.17*	3.70*	4.43*	5.14*	5.85*	7.28*	8.00*	9.47*	14.08*	19.04*	
	70	1.37*	2.29*	3.93*	4.71*	5.49*	6.26*	7.82*	8.61*	10.22*	15.34*	20.87*	
	80	1.43*	2.41*	4.15*	4.98*	5.81*	6.64*	8.33*	9.19*	10.95*	16.57*	22.64*	
400	5	0.64*	1.06*	1.76*	2.07*	2.37*	2.66*	3.21*	3.47*	3.99*	5.44*	6.82*	
	10	0.79*	1.30*	2.16*	2.55*	2.92*	3.28*	3.96*	4.30*	4.95*	6.82*	8.62*	
	20	0.98*	1.62*	2.70*	3.19*	3.67*	4.13*	5.02*	5.45*	6.31*	8.83*	11.34*	
	30	1.12*	1.85*	3.10*	3.68*	4.23*	4.77*	5.83*	6.35*	7.39*	10.48*	13.64*	
	40	1.23*	2.04*	3.44*	4.08*	4.71*	5.33*	6.53*	7.13*	8.33*	11.95*	15.73*	
	60	1.42*	2.36*	4.00*	4.77*	5.52*	6.27*	7.75*	8.49*	9.98*	14.63*	19.58*	
	70	1.50*	2.50*	4.25*	5.07*	5.88*	6.69*	8.29*	9.10*	10.74*	15.88*	21.39*	
	80	1.57*	2.62*	4.47*	5.35*	6.22*	7.08*	8.82*	9.69*	11.47*	17.09*	23.15*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 m (RADIUS = 0.0 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
0	5	0.30*	0.58*	1.14*	1.43*	1.72*	2.01*	2.61*	2.91*	3.53*	5.44*	7.42*
	10	0.36*	0.72*	1.49*	1.89*	2.29*	2.71*	3.56*	4.00*	4.90*	7.71*	10.68*
	20	0.46*	0.97*	2.07*	2.66*	3.26*	3.88*	5.17*	5.83*	7.20*	11.53*	16.15*
	30	0.55*	1.18*	2.58*	3.33*	4.11*	4.91*	6.58*	7.44*	9.22*	14.88*	20.95*
	40	0.64*	1.38*	3.05*	3.95*	4.89*	5.86*	7.87*	8.92*	11.07*	17.95*	25.36*
	60	0.79*	1.74*	3.91*	5.09*	6.31*	7.59*	10.24*	11.62*	14.46*	23.59*	33.43*
	70	0.86*	1.91*	4.31*	5.62*	6.98*	8.39*	11.35*	12.88*	16.05*	26.22*	37.20*
	80	0.93*	2.07*	4.70*	6.13*	7.62*	9.17*	12.42*	14.10*	17.58*	28.76*	40.84*
10	5	0.41*	0.72*	1.29*	1.57*	1.86*	2.15*	2.74*	3.04*	3.65*	5.55*	7.53*
	10	0.49*	0.86*	1.62*	2.01*	2.42*	2.83*	3.68*	4.11*	5.00*	7.80*	10.76*
	20	0.59*	1.10*	2.18*	2.76*	3.36*	3.98*	5.26*	5.93*	7.29*	11.61*	16.22*
	30	0.68*	1.30*	2.68*	3.43*	4.20*	5.00*	6.66*	7.52*	9.29*	14.95*	21.02*
	40	0.76*	1.49*	3.15*	4.04*	4.98*	5.94*	7.95*	8.99*	11.14*	18.02*	25.42*
	60	0.91*	1.84*	4.00*	5.17*	6.39*	7.66*	10.31*	11.69*	14.53*	23.65*	33.48*
	70	0.97*	2.01*	4.39*	5.70*	7.06*	8.47*	11.42*	12.95*	16.11*	26.28*	37.25*
	80	1.04*	2.17*	4.78*	6.21*	7.70*	9.24*	12.48*	14.16*	17.64*	28.81*	40.89*
20	5	0.47*	0.80*	1.40*	1.69*	1.99*	2.28*	2.87*	3.16*	3.77*	5.66*	7.63*
	10	0.55*	0.96*	1.74*	2.13*	2.53*	2.94*	3.78*	4.22*	5.10*	7.89*	10.85*
	20	0.68*	1.21*	2.29*	2.87*	3.47*	4.08*	5.36*	6.02*	7.37*	11.69*	16.30*
	30	0.77*	1.41*	2.79*	3.53*	4.30*	5.09*	6.75*	7.61*	9.37*	15.02*	21.08*
	40	0.86*	1.60*	3.24*	4.13*	5.06*	6.02*	8.03*	9.07*	11.22*	18.09*	25.48*
	60	1.01*	1.94*	4.08*	5.25*	6.47*	7.74*	10.38*	11.76*	14.59*	23.71*	33.54*
	70	1.07*	2.11*	4.48*	5.78*	7.13*	8.54*	11.48*	13.01*	16.18*	26.33*	37.31*
	80	1.14*	2.26*	4.86*	6.28*	7.77*	9.32*	12.55*	14.23*	17.70*	28.87*	40.94*
50	5	0.56*	0.95*	1.63*	1.95*	2.26*	2.57*	3.18*	3.49*	4.10*	5.98*	7.93*
	10	0.68*	1.15*	2.01*	2.42*	2.84*	3.25*	4.10*	4.53*	5.40*	8.17*	11.11*
	20	0.83*	1.43*	2.58*	3.16*	3.76*	4.37*	5.63*	6.29*	7.63*	11.92*	16.52*
	30	0.95*	1.66*	3.07*	3.81*	4.57*	5.36*	7.00*	7.85*	9.61*	15.23*	21.28*
	40	1.05*	1.86*	3.52*	4.40*	5.32*	6.27*	8.26*	9.30*	11.43*	18.28*	25.67*
	60	1.22*	2.21*	4.34*	5.49*	6.71*	7.96*	10.60*	11.96*	14.79*	23.89*	33.71*
	70	1.29*	2.37*	4.72*	6.01*	7.36*	8.76*	11.69*	13.21*	16.37*	26.51*	37.47*
	80	1.37*	2.53*	5.10*	6.51*	7.99*	9.53*	12.75*	14.42*	17.89*	29.04*	41.10*
100	5	0.66*	1.11*	1.88*	2.23*	2.58*	2.91*	3.57*	3.89*	4.54*	6.46*	8.42*
	10	0.80*	1.35*	2.31*	2.77*	3.21*	3.65*	4.53*	4.97*	5.86*	8.62*	11.54*
	20	0.99*	1.69*	2.95*	3.56*	4.17*	4.80*	6.06*	6.72*	8.05*	12.31*	16.88*
	30	1.14*	1.94*	3.46*	4.21*	4.99*	5.77*	7.41*	8.25*	9.99*	15.59*	21.61*
	40	1.25*	2.17*	3.91*	4.81*	5.73*	6.67*	8.65*	9.67*	11.80*	18.61*	25.97*
	60	1.45*	2.55*	4.73*	5.89*	7.09*	8.33*	10.95*	12.31*	15.12*	24.18*	33.98*
	70	1.54*	2.72*	5.11*	6.39*	7.73*	9.11*	12.03*	13.54*	16.68*	26.79*	37.74*
	80	1.62*	2.88*	5.48*	6.88*	8.35*	9.87*	13.07*	14.74*	18.19*	29.32*	41.36*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 m (RADIUS = 0.0 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TEMPERATURE
 TIME INDEX RISE

CEILING HEIGHT, m

(m*s)^{1/2}

°C

24

18

12

10

9

7

6

5

4

3

2

1

0.73*

0.89*

1.11*

1.27*

1.41*

1.63*

1.72*

1.81*

0.79*

0.97*

1.21*

1.38*

1.53*

1.77*

1.87*

1.97*

0.84*

1.03*

1.29*

1.48*

1.63*

1.89*

2.00*

2.10*

0.88*

1.09*

1.36*

1.56*

1.73*

2.00*

2.11*

2.22*

0.96*

1.19*

1.49*

1.71*

1.89*

2.18*

2.31*

2.43*

1.22*

1.50*

1.87*

2.16*

2.40*

2.81*

3.16*

2.06*

2.54*

3.22*

3.77*

4.24*

5.08*

5.46*

5.83*

2.20*

2.72*

3.24*

3.76*

4.03*

4.52*

5.38*

5.78*

6.15*

2.33*

2.85*

3.37*

3.90*

4.42*

5.29*

5.71*

6.08*

6.45*

6.82*

7.19*

7.56*

7.93*

8.30*

8.67*

9.04*

9.41*

9.78*

10.15*

10.52*

10.89*

11.26*

11.63*

12.00*

12.37*

12.74*

13.11*

13.48*

13.85*

14.22*

14.59*

14.96*

15.33*

15.70*

16.07*

16.44*

16.81*

17.18*

17.55*

17.92*

18.29*

18.66*

19.03*

19.40*

19.77*

20.14*

20.51*

20.88*

21.25*

21.62*

21.99*

22.36*

22.73*

23.10*

23.47*

23.84*

24.21*

24.58*

24.95*

25.32*

25.69*

26.06*

26.43*

26.80*

27.17*

27.54*

27.91*

28.28*

28.65*

29.02*

29.39*

29.76*

30.13*

30.50*

30.87*

31.24*

31.61*

31.98*

32.35*

32.72*

33.09*

33.46*

33.83*

34.20*

34.57*

34.94*

35.31*

35.68*

36.05*

36.42*

36.79*

37.16*

37.53*

37.90*

38.27*

38.64*

39.01*

39.38*

39.75*

40.12*

40.49*

40.86*

41.23*

41.60*

41.97*

42.34*

42.71*

43.08*

43.45*

43.82*

44.19*

44.56*

44.93*

45.30*

45.67*

46.04*

46.41*

46.78*

47.15*

47.52*

47.89*

48.26*

48.63*

49.00*

49.37*

49.74*

50.11*

50.48*

50.85*

51.22*

51.59*

51.96*

52.33*

52.70*

53.07*

53.44*

53.81*

54.18*

54.55*

54.92*

55.29*

55.66*

56.03*

56.40*

56.77*

57.14*

57.51*

57.88*

58.25*

58.62*

58.99*

59.36*

59.73*

60.10*

60.47*

60.84*

61.21*

61.58*

61.95*

62.32*

62.69*

63.06*

63.43*

63.80*

64.17*

64.54*

64.91*

65.28*

65.65*

66.02*

66.39*

66.76*

67.13*

67.50*

67.87*

68.24*

68.61*

68.98*

69.35*

69.72*

70.09*

70.46*

70.83*

71.20*

71.57*

71.94*

72.31*

72.68*

73.05*

73.42*

73.79*

74.16*

74.53*

74.90*

75.27*

75.64*

76.01*

76.38*

76.75*

77.12*

77.49*

77.86*

78.23*

78.60*

78.97*

79.34*

79.71*

80.08*

80.45*

80.82*

81.19*

81.56*

81.93*

82.30*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.5 m (RADIUS = 0.4 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °C	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2} 0	5	0.14	0.22*	0.37*	0.45*	0.52*	0.59*	0.73*	0.80*	0.94*	1.36*	1.78*
	10	0.15	0.24*	0.42*	0.51*	0.60*	0.69*	0.86*	0.95*	1.12*	1.66*	2.20*
	20	0.17	0.28*	0.51*	0.62*	0.73*	0.84*	1.07*	1.19*	1.43*	2.15*	2.90*
	30	0.19	0.32*	0.58*	0.71*	0.85*	0.98*	1.26*	1.40*	1.69*	2.58*	3.51*
	40	0.21	0.35*	0.65*	0.80*	0.95*	1.11*	1.43*	1.60*	1.93*	2.98*	4.08*
	60	0.24	0.41*	0.77*	0.96*	1.15*	1.35*	1.75*	1.96*	2.38*	3.71*	5.11*
	70	0.25	0.44*	0.83*	1.03*	1.24*	1.46*	1.90*	2.12*	2.59*	4.05*	5.59*
	80	0.27	0.46*	0.88*	1.10*	1.33*	1.56*	2.04*	2.28*	2.79*	4.37*	6.06*
10	5	0.19	0.29*	0.46*	0.54*	0.62*	0.69*	0.84*	0.91*	1.05*	1.47*	1.88*
	10	0.22	0.32*	0.52*	0.61*	0.70*	0.79*	0.96*	1.05*	1.22*	1.75*	2.28*
	20	0.25	0.37*	0.60*	0.71*	0.83*	0.94*	1.17*	1.28*	1.51*	2.23*	2.97*
	30	0.27	0.41*	0.67*	0.80*	0.94*	1.07*	1.35*	1.48*	1.77*	2.65*	3.58*
	40	0.29	0.44*	0.74*	0.89*	1.04*	1.19*	1.51*	1.67*	2.01*	3.05*	4.14*
	60	0.33	0.50*	0.85*	1.04*	1.23*	1.42*	1.82*	2.03*	2.44*	3.77*	5.17*
	70	0.34	0.53*	0.91*	1.11*	1.32*	1.53*	1.97*	2.19*	2.65*	4.10*	5.65*
	80	0.36	0.55*	0.96*	1.18*	1.40*	1.63*	2.11*	2.35*	2.85*	4.43*	6.11*
20	5	0.21	0.32*	0.50*	0.58*	0.67*	0.75*	0.90*	0.98*	1.12*	1.55*	1.97*
	10	0.24	0.36*	0.57*	0.66*	0.76*	0.85*	1.04*	1.13*	1.30*	1.83*	2.37*
	20	0.28	0.41*	0.66*	0.78*	0.90*	1.01*	1.25*	1.36*	1.59*	2.31*	3.04*
	30	0.31	0.46*	0.74*	0.88*	1.01*	1.15*	1.42*	1.56*	1.84*	2.72*	3.65*
	40	0.34	0.50*	0.81*	0.96*	1.12*	1.27*	1.59*	1.75*	2.08*	3.11*	4.20*
	60	0.38	0.56*	0.93*	1.11*	1.30*	1.49*	1.89*	2.09*	2.51*	3.83*	5.22*
	70	0.39	0.59*	0.98*	1.18*	1.39*	1.60*	2.03*	2.26*	2.71*	4.16*	5.70*
	80	0.41	0.62*	1.03*	1.25*	1.47*	1.70*	2.17*	2.41*	2.91*	4.49*	6.16*
50	5	0.25	0.37*	0.57*	0.67*	0.76*	0.85*	1.02*	1.10*	1.26*	1.73*	2.17*
	10	0.29	0.42*	0.66*	0.77*	0.88*	0.98*	1.18*	1.28*	1.47*	2.04*	2.58*
	20	0.34	0.50*	0.78*	0.92*	1.04*	1.17*	1.42*	1.54*	1.79*	2.51*	3.25*
	30	0.38	0.55*	0.87*	1.03*	1.17*	1.32*	1.61*	1.76*	2.04*	2.92*	3.84*
	40	0.41	0.60*	0.95*	1.12*	1.29*	1.45*	1.78*	1.94*	2.28*	3.30*	4.38*
	60	0.46	0.68*	1.09*	1.29*	1.48*	1.68*	2.08*	2.28*	2.70*	4.00*	5.39*
	70	0.49	0.71*	1.15*	1.36*	1.57*	1.79*	2.22*	2.44*	2.90*	4.33*	5.86*
	80	0.51	0.74*	1.20*	1.43*	1.66*	1.89*	2.36*	2.60*	3.09*	4.65*	6.32*
100	5	0.29	0.42*	0.65*	0.75*	0.86*	0.96*	1.14*	1.24*	1.41*	1.92*	2.39*
	10	0.34	0.49*	0.76*	0.88*	1.00*	1.12*	1.34*	1.45*	1.66*	2.27*	2.85*
	20	0.40	0.58*	0.91*	1.06*	1.20*	1.34*	1.62*	1.75*	2.02*	2.79*	3.55*
	30	0.45	0.65*	1.02*	1.19*	1.35*	1.52*	1.83*	1.99*	2.30*	3.21*	4.13*
	40	0.49	0.71*	1.11*	1.30*	1.48*	1.66*	2.02*	2.19*	2.54*	3.59*	4.67*
	60	0.56	0.80*	1.27*	1.49*	1.70*	1.91*	2.34*	2.55*	2.97*	4.28*	5.66*
	70	0.58	0.84*	1.33*	1.57*	1.80*	2.03*	2.48*	2.71*	3.17*	4.61*	6.12*
	80	0.61	0.88*	1.40*	1.65*	1.89*	2.13*	2.62*	2.87*	3.36*	4.92*	6.57*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.5 m (RADIUS = 0.4 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE	CEILING HEIGHT, m											
			1	2	4	5	6	7	9	10	12	18	24	
150 														

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.5 m (RADIUS = 0.4 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
0	5	0.20	0.31*	0.54*	0.65*	0.76*	0.87*	1.09*	1.20*	1.43*	2.09*	2.77*
	10	0.22	0.36*	0.64*	0.78*	0.92*	1.06*	1.35*	1.49*	1.78*	2.68*	3.60*
	20	0.26	0.44*	0.81*	1.00*	1.19*	1.38*	1.78*	1.98*	2.39*	3.67*	5.00*
	30	0.30	0.51*	0.95*	1.18*	1.42*	1.66*	2.15*	2.40*	2.92*	4.53*	6.23*
	40	0.33	0.57*	1.09*	1.36*	1.63*	1.92*	2.50*	2.79*	3.40*	5.32*	7.36*
	60	0.39	0.69*	1.33*	1.67*	2.03*	2.38*	3.13*	3.51*	4.29*	6.78*	9.43*
	70	0.42	0.75*	1.45*	1.82*	2.21*	2.60*	3.42*	3.84*	4.71*	7.46*	10.39*
	80	0.45	0.80*	1.56*	1.97*	2.38*	2.81*	3.71*	4.17*	5.11*	8.11*	11.33*
10	5	0.27	0.41*	0.65*	0.77*	0.88*	0.99*	1.22*	1.32*	1.54*	2.20*	2.87*
	10	0.31	0.46*	0.75*	0.90*	1.04*	1.18*	1.46*	1.60*	1.89*	2.77*	3.69*
	20	0.36	0.55*	0.92*	1.10*	1.29*	1.48*	1.87*	2.07*	2.48*	3.74*	5.08*
	30	0.41	0.62*	1.05*	1.28*	1.51*	1.75*	2.24*	2.49*	3.00*	4.60*	6.30*
	40	0.44	0.68*	1.18*	1.45*	1.72*	2.00*	2.57*	2.87*	3.48*	5.39*	7.42*
	60	0.50	0.79*	1.42*	1.76*	2.10*	2.46*	3.20*	3.58*	4.36*	6.84*	9.48*
	70	0.53	0.84*	1.53*	1.90*	2.28*	2.68*	3.49*	3.91*	4.77*	7.52*	10.45*
	80	0.56	0.89*	1.64*	2.04*	2.46*	2.89*	3.77*	4.23*	5.17*	8.17*	11.38*
20	5	0.31	0.45*	0.71*	0.84*	0.96*	1.07*	1.30*	1.42*	1.64*	2.30*	2.97*
	10	0.35	0.52*	0.83*	0.98*	1.12*	1.27*	1.55*	1.70*	1.98*	2.86*	3.77*
	20	0.41	0.61*	1.00*	1.19*	1.38*	1.57*	1.96*	2.16*	2.56*	3.82*	5.15*
	30	0.46	0.69*	1.14*	1.37*	1.60*	1.84*	2.32*	2.57*	3.07*	4.67*	6.36*
	40	0.50	0.76*	1.27*	1.53*	1.80*	2.08*	2.65*	2.95*	3.55*	5.46*	7.48*
	60	0.57	0.87*	1.50*	1.84*	2.18*	2.53*	3.27*	3.65*	4.43*	6.90*	9.54*
	70	0.60	0.92*	1.61*	1.98*	2.36*	2.75*	3.56*	3.98*	4.84*	7.57*	10.50*
	80	0.63	0.97*	1.72*	2.12*	2.53*	2.96*	3.84*	4.29*	5.23*	8.23*	11.43*
50	5	0.36	0.53*	0.82*	0.96*	1.10*	1.23*	1.48*	1.60*	1.84*	2.54*	3.23*
	10	0.42	0.62*	0.97*	1.13*	1.30*	1.45*	1.76*	1.91*	2.21*	3.11*	4.02*
	20	0.51	0.74*	1.17*	1.38*	1.58*	1.79*	2.19*	2.39*	2.80*	4.05*	5.36*
	30	0.57	0.83*	1.33*	1.57*	1.82*	2.06*	2.55*	2.79*	3.30*	4.88*	6.56*
	40	0.62	0.91*	1.47*	1.75*	2.02*	2.30*	2.87*	3.17*	3.76*	5.65*	7.67*
	60	0.70	1.04*	1.71*	2.05*	2.40*	2.75*	3.48*	3.85*	4.62*	7.08*	9.71*
	70	0.74	1.10*	1.83*	2.19*	2.57*	2.96*	3.76*	4.17*	5.03*	7.75*	10.66*
	80	0.78	1.16*	1.93*	2.33*	2.74*	3.16*	4.03*	4.49*	5.42*	8.39*	11.58*
100	5	0.42	0.60*	0.94*	1.10*	1.24*	1.39*	1.67*	1.80*	2.07*	2.82*	3.54*
	10	0.50	0.72*	1.12*	1.30*	1.48*	1.66*	2.00*	2.16*	2.49*	3.44*	4.37*
	20	0.60	0.87*	1.36*	1.59*	1.82*	2.04*	2.47*	2.68*	3.11*	4.39*	5.71*
	30	0.68	0.98*	1.55*	1.81*	2.08*	2.34*	2.85*	3.11*	3.62*	5.21*	6.88*
	40	0.74	1.07*	1.70*	2.00*	2.30*	2.60*	3.19*	3.49*	4.09*	5.97*	7.97*
	60	0.85	1.23*	1.97*	2.33*	2.69*	3.06*	3.79*	4.17*	4.93*	7.37*	9.98*
	70	0.89	1.30*	2.09*	2.48*	2.87*	3.27*	4.07*	4.48*	5.33*	8.03*	10.93*
	80	0.93	1.36*	2.20*	2.62*	3.04*	3.47*	4.34*	4.79*	5.71*	8.67*	11.84*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.5 m (RADIUS = 0.4 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TEMPERATURE
 TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	0.46	0.66*	1.02*	1.19*	1.35*	1.51*	1.80*	1.95*	2.23*	3.03*	3.79*
	10	0.55	0.79*	1.23*	1.43*	1.62*	1.81*	2.17*	2.35*	2.69*	3.69*	4.66*
	20	0.67	0.96*	1.50*	1.75*	1.99*	2.22*	2.69*	2.91*	3.36*	4.68*	6.02*
	30	0.76	1.09*	1.70*	1.99*	2.27*	2.55*	3.09*	3.36*	3.90*	5.52*	7.19*
	40	0.83	1.19*	1.88*	2.20*	2.51*	2.83*	3.44*	3.75*	4.37*	6.27*	8.26*
	60	0.95	1.37*	2.17*	2.55*	2.93*	3.31*	4.06*	4.45*	5.22*	7.65*	10.25*
	70	1.00	1.44*	2.30*	2.71*	3.12*	3.52*	4.35*	4.77*	5.62*	8.31*	11.19*
	80	1.04	1.51*	2.42*	2.85*	3.29*	3.73*	4.62*	5.07*	6.00*	8.94*	12.10*
200	5	0.49	0.71*	1.09*	1.27*	1.44*	1.60*	1.92*	2.07*	2.36*	3.20*	3.99*
	10	0.59	0.85*	1.31*	1.53*	1.73*	1.93*	2.31*	2.50*	2.86*	3.90*	4.91*
	20	0.73	1.04*	1.61*	1.87*	2.13*	2.38*	2.86*	3.10*	3.57*	4.94*	6.30*
	30	0.82	1.18*	1.83*	2.14*	2.43*	2.72*	3.29*	3.57*	4.13*	5.79*	7.47*
	40	0.90	1.29*	2.02*	2.36*	2.69*	3.02*	3.66*	3.98*	4.62*	6.55*	8.55*
	60	1.03	1.48*	2.33*	2.73*	3.13*	3.52*	4.30*	4.69*	5.48*	7.93*	10.52*
	70	1.09	1.56*	2.47*	2.90*	3.32*	3.75*	4.59*	5.02*	5.88*	8.57*	11.45*
	80	1.14	1.64*	2.59*	3.05*	3.51*	3.96*	4.87*	5.33*	6.26*	9.20*	12.35*
250	5	0.52	0.75*	1.15*	1.34*	1.51*	1.68*	2.01*	2.17*	2.48*	3.35*	4.17*
	10	0.63	0.90*	1.39*	1.61*	1.83*	2.03*	2.43*	2.63*	3.01*	4.09*	5.12*
	20	0.77	1.10*	1.71*	1.98*	2.25*	2.51*	3.02*	3.27*	3.75*	5.16*	6.55*
	30	0.88	1.25*	1.94*	2.26*	2.57*	2.88*	3.47*	3.76*	4.33*	6.03*	7.74*
	40	0.96	1.38*	2.14*	2.50*	2.85*	3.19*	3.85*	4.18*	4.84*	6.80*	8.81*
	60	1.10	1.58*	2.47*	2.89*	3.30*	3.71*	4.51*	4.92*	5.72*	8.19*	10.78*
	70	1.16	1.67*	2.61*	3.06*	3.51*	3.94*	4.81*	5.25*	6.12*	8.83*	11.70*
	80	1.22	1.75*	2.75*	3.23*	3.70*	4.16*	5.09*	5.56*	6.51*	9.46*	12.60*
300	5	0.55	0.78*	1.20*	1.39*	1.58*	1.76*	2.10*	2.26*	2.58*	3.48*	4.32*
	10	0.66	0.94*	1.45*	1.69*	1.91*	2.13*	2.54*	2.74*	3.14*	4.25*	5.32*
	20	0.82	1.16*	1.79*	2.08*	2.36*	2.63*	3.16*	3.41*	3.91*	5.37*	6.79*
	30	0.93	1.32*	2.04*	2.38*	2.70*	3.01*	3.63*	3.93*	4.52*	6.25*	7.99*
	40	1.02	1.45*	2.25*	2.62*	2.98*	3.34*	4.02*	4.36*	5.04*	7.04*	9.07*
	60	1.16	1.66*	2.59*	3.03*	3.46*	3.88*	4.71*	5.12*	5.94*	8.44*	11.03*
	70	1.23	1.76*	2.75*	3.21*	3.67*	4.12*	5.01*	5.46*	6.35*	9.08*	11.95*
	80	1.29	1.84*	2.89*	3.38*	3.87*	4.35*	5.30*	5.78*	6.74*	9.70*	12.84*
400	5	0.59	0.84*	1.29*	1.50*	1.69*	1.88*	2.24*	2.42*	2.76*	3.71*	4.60*
	10	0.72	1.02*	1.57*	1.82*	2.06*	2.29*	2.73*	2.94*	3.36*	4.54*	5.66*
	20	0.89	1.26*	1.94*	2.25*	2.55*	2.84*	3.40*	3.67*	4.20*	5.72*	7.20*
	30	1.01	1.44*	2.21*	2.57*	2.92*	3.25*	3.90*	4.22*	4.84*	6.65*	8.44*
	40	1.11	1.58*	2.44*	2.84*	3.22*	3.60*	4.33*	4.68*	5.39*	7.46*	9.54*
	60	1.27	1.81*	2.81*	3.28*	3.73*	4.18*	5.05*	5.48*	6.33*	8.89*	11.52*
	70	1.34	1.91*	2.97*	3.47*	3.96*	4.43*	5.37*	5.83*	6.75*	9.54*	12.43*
	80	1.41	2.01*	3.12*	3.65*	4.16*	4.67*	5.67*	6.16*	7.15*	10.17*	13.32*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.5 m (RADIUS = 0.4 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
0	5	0.29	0.46*	0.81*	0.99*	1.16*	1.34*	1.70*	1.88*	2.24*	3.35*	4.48*
	10	0.33	0.56*	1.01*	1.24*	1.48*	1.72*	2.21*	2.45*	2.96*	4.52*	6.15*
	20	0.42	0.71*	1.35*	1.67*	2.01*	2.36*	3.06*	3.42*	4.16*	6.49*	8.95*
	30	0.49	0.85*	1.64*	2.05*	2.48*	2.91*	3.81*	4.28*	5.22*	8.22*	11.41*
	40	0.55	0.98*	1.91*	2.40*	2.91*	3.43*	4.50*	5.06*	6.19*	9.81*	13.67*
	60	0.67	1.22*	2.40*	3.03*	3.69*	4.36*	5.76*	6.49*	7.97*	12.72*	17.80*
	70	0.73	1.32*	2.63*	3.33*	4.05*	4.80*	6.35*	7.16*	8.81*	14.08*	19.74*
	80	0.78	1.43*	2.85*	3.62*	4.41*	5.22*	6.92*	7.80*	9.61*	15.39*	21.60*
10	5	0.39	0.58*	0.95*	1.12*	1.30*	1.48*	1.83*	2.00*	2.36*	3.46*	4.59*
	10	0.45	0.68*	1.14*	1.37*	1.60*	1.84*	2.32*	2.56*	3.06*	4.61*	6.24*
	20	0.54	0.84*	1.46*	1.78*	2.11*	2.45*	3.16*	3.52*	4.25*	6.57*	9.03*
	30	0.62	0.97*	1.74*	2.15*	2.57*	3.00*	3.90*	4.36*	5.30*	8.29*	11.48*
	40	0.68	1.09*	2.00*	2.49*	2.99*	3.51*	4.58*	5.13*	6.27*	9.88*	13.73*
	60	0.80	1.32*	2.49*	3.12*	3.77*	4.44*	5.83*	6.56*	8.04*	12.78*	17.86*
	70	0.85	1.42*	2.72*	3.41*	4.13*	4.87*	6.42*	7.22*	8.87*	14.14*	19.79*
	80	0.90	1.53*	2.93*	3.69*	4.48*	5.29*	6.99*	7.86*	9.67*	15.45*	21.65*
20	5	0.44	0.65*	1.04*	1.22*	1.40*	1.58*	1.94*	2.12*	2.48*	3.57*	4.69*
	10	0.51	0.76*	1.24*	1.47*	1.71*	1.94*	2.42*	2.67*	3.16*	4.71*	6.32*
	20	0.62	0.93*	1.56*	1.88*	2.21*	2.55*	3.25*	3.61*	4.34*	6.65*	9.10*
	30	0.70	1.07*	1.84*	2.24*	2.66*	3.09*	3.98*	4.44*	5.38*	8.36*	11.54*
	40	0.77	1.19*	2.10*	2.58*	3.08*	3.59*	4.66*	5.21*	6.34*	9.94*	13.79*
	60	0.89	1.41*	2.57*	3.20*	3.85*	4.51*	5.91*	6.63*	8.11*	12.84*	17.92*
	70	0.95	1.52*	2.80*	3.49*	4.21*	4.95*	6.49*	7.29*	8.93*	14.19*	19.84*
	80	1.00	1.62*	3.01*	3.77*	4.55*	5.36*	7.05*	7.93*	9.73*	15.50*	21.70*
50	5	0.52	0.76*	1.20*	1.41*	1.61*	1.81*	2.19*	2.38*	2.75*	3.86*	4.98*
	10	0.62	0.91*	1.45*	1.70*	1.95*	2.20*	2.70*	2.94*	3.44*	4.98*	6.58*
	20	0.76	1.11*	1.80*	2.14*	2.48*	2.82*	3.51*	3.87*	4.59*	6.88*	9.32*
	30	0.86	1.27*	2.09*	2.50*	2.92*	3.35*	4.23*	4.68*	5.61*	8.58*	11.74*
	40	0.94	1.41*	2.35*	2.83*	3.33*	3.83*	4.89*	5.44*	6.56*	10.14*	13.98*
	60	1.09	1.65*	2.82*	3.44*	4.08*	4.74*	6.12*	6.83*	8.30*	13.02*	18.08*
	70	1.15	1.75*	3.04*	3.72*	4.43*	5.16*	6.69*	7.49*	9.12*	14.37*	20.00*
	80	1.21	1.85*	3.25*	3.99*	4.77*	5.57*	7.25*	8.12*	9.92*	15.67*	21.86*
100	5	0.61	0.88*	1.38*	1.61*	1.83*	2.05*	2.47*	2.67*	3.07*	4.25*	5.40*
	10	0.74	1.06*	1.67*	1.95*	2.23*	2.50*	3.03*	3.29*	3.82*	5.38*	6.99*
	20	0.90	1.31*	2.08*	2.44*	2.80*	3.16*	3.88*	4.25*	4.98*	7.26*	9.68*
	30	1.03	1.50*	2.40*	2.83*	3.27*	3.71*	4.60*	5.06*	5.98*	8.92*	12.07*
	40	1.13	1.65*	2.67*	3.18*	3.69*	4.20*	5.26*	5.80*	6.91*	10.47*	14.28*
	60	1.30	1.92*	3.16*	3.79*	4.43*	5.09*	6.46*	7.17*	8.63*	13.31*	18.36*
	70	1.37	2.04*	3.38*	4.07*	4.78*	5.51*	7.03*	7.81*	9.44*	14.65*	20.27*
	80	1.44	2.15*	3.59*	4.34*	5.12*	5.91*	7.58*	8.44*	10.22*	15.94*	22.12*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.5 m (RADIUS = 0.4 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

CEILING HEIGHT, m

RESPONSE TEMPERATURE
TIME INDEX RISE

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	0.68	0.97*	1.51*	1.76*	1.99*	2.23*	2.67*	2.89*	3.32*	4.55*	5.74*
	10	0.82	1.18*	1.83*	2.14*	2.43*	2.72*	3.29*	3.56*	4.11*	5.73*	7.36*
	20	1.01	1.45*	2.28*	2.67*	3.06*	3.44*	4.19*	4.56*	5.31*	7.62*	10.03*
	30	1.15	1.66*	2.63*	3.09*	3.55*	4.01*	4.93*	5.39*	6.33*	9.26*	12.39*
	40	1.26	1.83*	2.93*	3.46*	3.98*	4.51*	5.59*	6.13*	7.25*	10.79*	14.59*
	60	1.45	2.12*	3.44*	4.09*	4.75*	5.41*	6.79*	7.49*	8.95*	13.61*	18.64*
	70	1.54	2.25*	3.67*	4.38*	5.10*	5.83*	7.35*	8.13*	9.75*	14.94*	20.54*
	80	1.61	2.37*	3.89*	4.65*	5.43*	6.23*	7.89*	8.75*	10.52*	16.22*	22.38*
200	5	0.73	1.04*	1.61*	1.88*	2.13*	2.37*	2.84*	3.07*	3.52*	4.80*	6.04*
	10	0.88	1.27*	1.97*	2.29*	2.60*	2.91*	3.50*	3.79*	4.36*	6.03*	7.69*
	20	1.09	1.57*	2.45*	2.87*	3.27*	3.67*	4.45*	4.84*	5.61*	7.95*	10.36*
	30	1.25	1.79*	2.82*	3.31*	3.79*	4.26*	5.21*	5.68*	6.64*	9.59*	12.71*
	40	1.37	1.98*	3.14*	3.69*	4.24*	4.79*	5.88*	6.44*	7.56*	11.10*	14.89*
	60	1.58	2.29*	3.67*	4.35*	5.02*	5.70*	7.09*	7.80*	9.26*	13.90*	18.91*
	70	1.67	2.43*	3.91*	4.64*	5.38*	6.13*	7.65*	8.44*	10.05*	15.22*	20.80*
	80	1.75	2.56*	4.14*	4.93*	5.72*	6.53*	8.19*	9.05*	10.82*	16.49*	22.63*
250	5	0.77	1.10*	1.70*	1.98*	2.24*	2.50*	2.99*	3.23*	3.69*	5.02*	6.29*
	10	0.94	1.34*	2.08*	2.42*	2.75*	3.07*	3.68*	3.99*	4.58*	6.30*	7.99*
	20	1.17	1.67*	2.60*	3.03*	3.45*	3.87*	4.68*	5.08*	5.87*	8.25*	10.68*
	30	1.33	1.91*	2.99*	3.50*	4.00*	4.49*	5.46*	5.95*	6.92*	9.90*	13.02*
	40	1.47	2.11*	3.32*	3.90*	4.46*	5.03*	6.15*	6.72*	7.86*	11.41*	15.18*
	60	1.69	2.44*	3.88*	4.58*	5.27*	5.97*	7.37*	8.09*	9.55*	14.19*	19.18*
	70	1.78	2.58*	4.13*	4.88*	5.64*	6.39*	7.94*	8.73*	10.34*	15.50*	21.06*
	80	1.87	2.72*	4.36*	5.17*	5.98*	6.80*	8.48*	9.34*	11.10*	16.76*	22.89*
300	5	0.81	1.16*	1.78*	2.07*	2.34*	2.61*	3.12*	3.37*	3.85*	5.22*	6.53*
	10	0.99	1.41*	2.18*	2.54*	2.88*	3.21*	3.85*	4.16*	4.77*	6.54*	8.27*
	20	1.23	1.76*	2.73*	3.18*	3.62*	4.04*	4.88*	5.29*	6.11*	8.53*	10.99*
	30	1.41	2.01*	3.14*	3.67*	4.18*	4.69*	5.69*	6.19*	7.18*	10.19*	13.32*
	40	1.55	2.22*	3.48*	4.08*	4.67*	5.25*	6.40*	6.97*	8.13*	11.70*	15.47*
	60	1.78	2.57*	4.07*	4.78*	5.50*	6.21*	7.64*	8.36*	9.83*	14.47*	19.45*
	70	1.89	2.72*	4.32*	5.10*	5.87*	6.64*	8.20*	9.00*	10.62*	15.77*	21.33*
	80	1.98	2.86*	4.56*	5.39*	6.22*	7.06*	8.75*	9.61*	11.38*	17.03*	23.14*
400	5	0.88	1.25*	1.92*	2.22*	2.52*	2.80*	3.34*	3.60*	4.11*	5.56*	6.93*
	10	1.08	1.53*	2.36*	2.74*	3.10*	3.45*	4.13*	4.46*	5.11*	6.97*	8.76*
	20	1.34	1.91*	2.95*	3.43*	3.90*	4.35*	5.24*	5.67*	6.52*	9.04*	11.55*
	30	1.53	2.19*	3.40*	3.96*	4.51*	5.04*	6.09*	6.61*	7.64*	10.73*	13.90*
	40	1.69	2.42*	3.77*	4.40*	5.02*	5.63*	6.83*	7.43*	8.62*	12.25*	16.04*
	60	1.95	2.80*	4.39*	5.15*	5.90*	6.64*	8.11*	8.86*	10.35*	15.02*	19.99*
	70	2.06	2.96*	4.66*	5.48*	6.28*	7.09*	8.69*	9.50*	11.15*	16.31*	21.85*
	80	2.16	3.11*	4.92*	5.79*	6.65*	7.51*	9.25*	10.13*	11.91*	17.56*	23.65*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.5 m (RADIUS = 0.4 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	°C												
	5	0.42	0.70*	1.27*	1.56*	1.85*	2.15*	2.75*	3.05*	3.67*	5.59*	7.58*	
	10	0.52	0.89*	1.67*	2.07*	2.48*	2.90*	3.77*	4.21*	5.11*	7.93*	10.91*	
	20	0.69	1.21*	2.34*	2.93*	3.55*	4.18*	5.48*	6.15*	7.52*	11.88*	16.52*	
	30	0.83	1.49*	2.92*	3.69*	4.48*	5.29*	6.98*	7.85*	9.64*	15.34*	21.44*	
	40	0.96	1.74*	3.46*	4.38*	5.33*	6.31*	8.36*	9.41*	11.58*	18.51*	25.95*	
	60	1.20	2.21*	4.45*	5.65*	6.90*	8.19*	10.88*	12.27*	15.14*	24.33*	34.22*	
	70	1.32	2.43*	4.91*	6.24*	7.63*	9.07*	12.06*	13.61*	16.81*	27.05*	38.09*	
	80	1.42	2.64*	5.35*	6.82*	8.34*	9.91*	13.20*	14.90*	18.41*	29.67*	41.81*	
10	5	0.57	0.86*	1.42*	1.71*	2.00*	2.29*	2.88*	3.18*	3.79*	5.70*	7.68*	
	10	0.68	1.04*	1.80*	2.20*	2.61*	3.02*	3.88*	4.32*	5.21*	8.03*	11.00*	
	20	0.84	1.34*	2.45*	3.04*	3.65*	4.28*	5.57*	6.24*	7.61*	11.96*	16.59*	
	30	0.98	1.61*	3.03*	3.79*	4.57*	5.38*	7.06*	7.93*	9.72*	15.41*	21.50*	
	40	1.10	1.86*	3.56*	4.47*	5.42*	6.40*	8.43*	9.49*	11.66*	18.58*	26.01*	
	60	1.33	2.31*	4.53*	5.73*	6.98*	8.27*	10.95*	12.34*	15.21*	24.39*	34.28*	
	70	1.44	2.53*	4.99*	6.32*	7.71*	9.14*	12.13*	13.68*	16.87*	27.11*	38.14*	
	80	1.54	2.74*	5.43*	6.89*	8.41*	9.98*	13.26*	14.96*	18.47*	29.73*	41.87*	
20	5	0.64	0.95*	1.54*	1.83*	2.12*	2.42*	3.01*	3.31*	3.91*	5.81*	7.79*	
	10	0.76	1.15*	1.92*	2.32*	2.72*	3.14*	3.99*	4.42*	5.31*	8.12*	11.09*	
	20	0.94	1.46*	2.56*	3.15*	3.75*	4.37*	5.66*	6.33*	7.70*	12.04*	16.67*	
	30	1.09	1.72*	3.13*	3.88*	4.66*	5.47*	7.15*	8.01*	9.80*	15.48*	21.57*	
	40	1.22	1.97*	3.65*	4.56*	5.51*	6.48*	8.51*	9.56*	11.73*	18.65*	26.08*	
	60	1.45	2.41*	4.62*	5.82*	7.06*	8.34*	11.02*	12.41*	15.27*	24.45*	34.33*	
	70	1.56	2.63*	5.08*	6.40*	7.78*	9.21*	12.20*	13.74*	16.93*	27.16*	38.19*	
	80	1.66	2.83*	5.51*	6.97*	8.49*	10.05*	13.33*	15.03*	18.53*	29.78*	41.92*	
50	5	0.77	1.12*	1.79*	2.10*	2.41*	2.72*	3.33*	3.63*	4.25*	6.13*	8.09*	
	10	0.93	1.37*	2.21*	2.62*	3.04*	3.45*	4.30*	4.73*	5.61*	8.40*	11.35*	
	20	1.15	1.72*	2.86*	3.45*	4.05*	4.66*	5.94*	6.60*	7.95*	12.27*	16.89*	
	30	1.32	2.00*	3.42*	4.16*	4.94*	5.74*	7.40*	8.26*	10.03*	15.69*	21.77*	
	40	1.47	2.25*	3.93*	4.83*	5.76*	6.73*	8.75*	9.79*	11.95*	18.84*	26.26*	
	60	1.72	2.70*	4.88*	6.06*	7.29*	8.57*	11.23*	12.62*	15.47*	24.63*	34.50*	
	70	1.83	2.90*	5.32*	6.64*	8.01*	9.43*	12.40*	13.94*	17.12*	27.34*	38.35*	
	80	1.94	3.10*	5.75*	7.20*	8.70*	10.26*	13.53*	15.22*	18.72*	29.95*	42.07*	
100	5	0.90	1.31*	2.05*	2.40*	2.74*	3.07*	3.73*	4.05*	4.69*	6.61*	8.58*	
	10	1.10	1.60*	2.54*	2.98*	3.43*	3.87*	4.74*	5.18*	6.08*	8.85*	11.77*	
	20	1.37	2.01*	3.25*	3.86*	4.47*	5.10*	6.38*	7.03*	8.38*	12.66*	17.25*	
	30	1.57	2.32*	3.83*	4.59*	5.36*	6.16*	7.81*	8.66*	10.42*	16.04*	22.10*	
	40	1.74	2.60*	4.34*	5.25*	6.18*	7.13*	9.13*	10.17*	12.31*	19.17*	26.57*	
	60	2.03	3.07*	5.28*	6.45*	7.67*	8.94*	11.58*	12.96*	15.80*	24.93*	34.78*	
	70	2.16	3.28*	5.72*	7.02*	8.38*	9.79*	12.74*	14.27*	17.44*	27.62*	38.62*	
	80	2.27	3.49*	6.14*	7.57*	9.06*	10.61*	13.85*	15.54*	19.03*	30.23*	42.33*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.5 m (RADIUS = 0.4 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

CEILING HEIGHT, m

RESPONSE TEMPERATURE
TIME INDEX RISE

(m*s)^{1/2}

°C

	1	2	4	5	6	7	9	10	12	18	24
150	1.00	1.44*	2.25*	2.62*	2.99*	3.34*	4.03*	4.37*	5.04*	7.03*	9.02*
	1.23	1.77*	2.78*	3.26*	3.73*	4.19*	5.11*	5.56*	6.47*	9.27*	12.19*
	1.53	2.22*	3.55*	4.19*	4.83*	5.47*	6.77*	7.43*	8.78*	13.04*	17.61*
	1.76	2.57*	4.16*	4.94*	5.74*	6.54*	8.19*	9.05*	10.80*	16.39*	22.43*
	1.95	2.86*	4.69*	5.61*	6.55*	7.51*	9.51*	10.54*	12.67*	19.50*	26.87*
	2.26	3.37*	5.64*	6.82*	8.04*	9.30*	11.93*	13.30*	16.13*	25.23*	35.06*
	2.40	3.59*	6.08*	7.39*	8.74*	10.14*	13.07*	14.60*	17.76*	27.91*	38.89*
	2.53	3.81*	6.50*	7.93*	9.41*	10.95*	14.18*	15.86*	19.33*	30.51*	42.59*
200	1.08	1.55*	2.41*	2.80*	3.19*	3.56*	4.29*	4.64*	5.34*	7.39*	9.41*
	1.33	1.91*	2.98*	3.49*	3.98*	4.46*	5.41*	5.88*	6.82*	9.66*	12.59*
	1.66	2.40*	3.80*	4.47*	5.13*	5.79*	7.12*	7.79*	9.15*	13.41*	17.97*
	1.91	2.77*	4.44*	5.25*	6.07*	6.89*	8.56*	9.41*	11.16*	16.74*	22.75*
	2.11	3.08*	4.99*	5.94*	6.89*	7.87*	9.87*	10.90*	13.02*	19.83*	27.18*
	2.45	3.62*	5.96*	7.16*	8.39*	9.65*	12.27*	13.63*	16.45*	25.52*	35.33*
	2.60	3.85*	6.41*	7.73*	9.08*	10.48*	13.40*	14.92*	18.07*	28.20*	39.16*
	2.74	4.07*	6.84*	8.27*	9.75*	11.29*	14.50*	16.17*	19.63*	30.78*	42.85*
250	1.15	1.64*	2.54*	2.96*	3.36*	3.75*	4.51*	4.87*	5.60*	7.70*	9.77*
	1.41	2.03*	3.16*	3.68*	4.20*	4.70*	5.68*	6.17*	7.13*	10.02*	12.97*
	1.77	2.55*	4.02*	4.71*	5.40*	6.08*	7.44*	8.12*	9.50*	13.78*	18.32*
	2.04	2.94*	4.68*	5.52*	6.36*	7.20*	8.89*	9.75*	11.51*	17.08*	23.08*
	2.25	3.28*	5.26*	6.23*	7.21*	8.19*	10.21*	11.24*	13.36*	20.15*	27.48*
	2.62	3.83*	6.26*	7.47*	8.71*	9.98*	12.60*	13.96*	16.77*	25.82*	35.61*
	2.77	4.08*	6.71*	8.04*	9.41*	10.81*	13.73*	15.24*	18.38*	28.48*	39.42*
	2.92	4.31*	7.14*	8.59*	10.08*	11.62*	14.82*	16.49*	19.94*	31.06*	43.11*
300	1.21	1.72*	2.66*	3.10*	3.51*	3.92*	4.70*	5.08*	5.83*	7.99*	10.10*
	1.49	2.13*	3.31*	3.86*	4.39*	4.91*	5.93*	6.43*	7.41*	10.36*	13.33*
	1.87	2.68*	4.21*	4.93*	5.64*	6.34*	7.73*	8.43*	9.82*	14.13*	18.67*
	2.15	3.10*	4.90*	5.77*	6.63*	7.48*	9.21*	10.08*	11.85*	17.42*	23.40*
	2.38	3.45*	5.50*	6.49*	7.49*	8.49*	10.53*	11.57*	13.69*	20.47*	27.79*
	2.76	4.03*	6.52*	7.76*	9.02*	10.29*	12.93*	14.28*	17.09*	26.11*	35.88*
	2.93	4.28*	6.98*	8.34*	9.72*	11.13*	14.05*	15.56*	18.69*	28.76*	39.69*
	3.08	4.52*	7.42*	8.89*	10.39*	11.93*	15.13*	16.79*	20.23*	31.33*	43.37*
400	1.31	1.86*	2.87*	3.33*	3.78*	4.21*	5.04*	5.44*	6.23*	8.50*	10.69*
	1.62	2.31*	3.58*	4.16*	4.73*	5.28*	6.35*	6.88*	7.91*	10.96*	14.00*
	2.04	2.92*	4.55*	5.31*	6.06*	6.80*	8.25*	8.97*	10.41*	14.78*	19.34*
	2.35	3.37*	5.29*	6.20*	7.10*	7.99*	9.77*	10.67*	12.47*	18.07*	24.03*
	2.60	3.74*	5.92*	6.96*	8.00*	9.04*	11.12*	12.18*	14.32*	21.10*	28.39*
	3.02	4.37*	6.99*	8.28*	9.57*	10.87*	13.54*	14.90*	17.70*	26.69*	36.43*
	3.19	4.64*	7.47*	8.87*	10.28*	11.71*	14.66*	16.17*	19.29*	29.33*	40.22*
	3.36	4.90*	7.92*	9.44*	10.96*	12.52*	15.74*	17.40*	20.82*	31.88*	43.88*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.0 m (RADIUS = 0.7 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	5	0.18	0.26	0.41*	0.48*	0.55*	0.62*	0.77*	0.84*	0.98*	1.40*	1.81*	
	10	0.20	0.29	0.46*	0.55*	0.64*	0.73*	0.90*	0.99*	1.16*	1.70*	2.24*	
	20	0.22	0.33	0.56*	0.67*	0.78*	0.90*	1.13*	1.24*	1.48*	2.21*	2.96*	
	30	0.25	0.38	0.64*	0.77*	0.91*	1.05*	1.33*	1.47*	1.76*	2.65*	3.59*	
	40	0.27	0.42	0.71*	0.87*	1.03*	1.18*	1.51*	1.67*	2.01*	3.06*	4.16*	
	60	0.31	0.49	0.85*	1.04*	1.24*	1.44*	1.84*	2.05*	2.48*	3.81*	5.22*	
	70	0.33	0.52	0.92*	1.13*	1.34*	1.56*	2.00*	2.23*	2.70*	4.16*	5.72*	
	80	0.35	0.55	0.98*	1.21*	1.43*	1.67*	2.15*	2.40*	2.91*	4.50*	6.19*	
10	5	0.25	0.33	0.50*	0.57*	0.65*	0.73*	0.87*	0.94*	1.08*	1.50*	1.91*	
	10	0.28	0.37	0.56*	0.65*	0.74*	0.83*	1.00*	1.09*	1.26*	1.79*	2.33*	
	20	0.32	0.43	0.65*	0.77*	0.88*	0.99*	1.22*	1.33*	1.57*	2.29*	3.03*	
	30	0.35	0.48	0.73*	0.87*	1.00*	1.13*	1.41*	1.55*	1.84*	2.72*	3.65*	
	40	0.38	0.52	0.81*	0.96*	1.11*	1.27*	1.59*	1.75*	2.08*	3.13*	4.23*	
	60	0.43	0.59	0.94*	1.13*	1.32*	1.51*	1.91*	2.12*	2.54*	3.87*	5.28*	
	70	0.45	0.62	1.00*	1.20*	1.41*	1.63*	2.07*	2.30*	2.76*	4.22*	5.77*	
	80	0.47	0.65	1.06*	1.28*	1.51*	1.74*	2.22*	2.46*	2.97*	4.56*	6.25*	
20	5	0.28	0.37	0.54*	0.62*	0.70*	0.78*	0.94*	1.01*	1.16*	1.59*	2.00*	
	10	0.31	0.41	0.61*	0.71*	0.80*	0.90*	1.08*	1.17*	1.35*	1.88*	2.41*	
	20	0.37	0.48	0.72*	0.84*	0.95*	1.07*	1.30*	1.42*	1.65*	2.36*	3.10*	
	30	0.40	0.53	0.81*	0.94*	1.08*	1.21*	1.49*	1.63*	1.91*	2.79*	3.72*	
	40	0.44	0.58	0.88*	1.03*	1.19*	1.34*	1.66*	1.83*	2.16*	3.19*	4.29*	
	60	0.49	0.66	1.01*	1.20*	1.39*	1.59*	1.98*	2.19*	2.61*	3.93*	5.33*	
	70	0.51	0.69	1.08*	1.28*	1.49*	1.70*	2.14*	2.36*	2.82*	4.28*	5.82*	
	80	0.54	0.72	1.14*	1.35*	1.58*	1.81*	2.28*	2.53*	3.03*	4.61*	6.30*	
50	5	0.32	0.42	0.62*	0.71*	0.80*	0.89*	1.06*	1.14*	1.30*	1.76*	2.20*	
	10	0.38	0.49	0.71*	0.82*	0.93*	1.03*	1.23*	1.33*	1.52*	2.08*	2.63*	
	20	0.45	0.58	0.85*	0.98*	1.11*	1.23*	1.48*	1.60*	1.85*	2.57*	3.31*	
	30	0.50	0.64	0.95*	1.10*	1.25*	1.39*	1.68*	1.82*	2.11*	3.00*	3.91*	
	40	0.54	0.70	1.04*	1.20*	1.37*	1.53*	1.86*	2.02*	2.36*	3.39*	4.47*	
	60	0.61	0.79	1.18*	1.38*	1.58*	1.78*	2.18*	2.38*	2.80*	4.11*	5.50*	
	70	0.64	0.83	1.25*	1.46*	1.68*	1.89*	2.33*	2.55*	3.01*	4.45*	5.98*	
	80	0.67	0.87	1.31*	1.54*	1.77*	2.00*	2.47*	2.71*	3.21*	4.78*	6.45*	
100	5	0.37	0.48	0.70*	0.80*	0.90*	1.00*	1.19*	1.28*	1.46*	1.96*	2.43*	
	10	0.44	0.57	0.82*	0.94*	1.06*	1.17*	1.40*	1.50*	1.71*	2.32*	2.90*	
	20	0.53	0.68	0.98*	1.13*	1.27*	1.41*	1.68*	1.82*	2.08*	2.85*	3.61*	
	30	0.59	0.76	1.10*	1.27*	1.43*	1.59*	1.91*	2.06*	2.37*	3.28*	4.21*	
	40	0.64	0.83	1.20*	1.39*	1.57*	1.75*	2.10*	2.28*	2.62*	3.68*	4.76*	
	60	0.73	0.94	1.38*	1.59*	1.81*	2.02*	2.44*	2.65*	3.08*	4.39*	5.77*	
	70	0.77	0.99	1.45*	1.68*	1.91*	2.14*	2.59*	2.82*	3.28*	4.72*	6.25*	
	80	0.80	1.03	1.52*	1.77*	2.01*	2.25*	2.74*	2.99*	3.48*	5.05*	6.71*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.0 m (RADIUS = 0.7 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

CEILING HEIGHT, m

RESPONSE TEMPERATURE
TIME INDEX RISE

(m*s)^{1/2}

°C

1

2

4

5

6

7

9

10

12

18

24

150

5

0.41

0.53

0.76*

0.87*

0.98*

1.08*

1.28*

1.38*

1.57*

2.10*

2.60*

10

0.49

0.62

0.90*

1.03*

1.15*

1.28*

1.51*

1.63*

1.85*

2.49*

3.11*

20

0.59

0.75

1.08*

1.24*

1.39*

1.54*

1.84*

1.98*

2.26*

3.07*

3.85*

30

0.66

0.84

1.22*

1.40*

1.57*

1.75*

2.08*

2.25*

2.57*

3.52*

4.47*

40

0.72

0.92

1.33*

1.53*

1.72*

1.92*

2.29*

2.47*

2.84*

3.92*

5.02*

60

0.82

1.04

1.52*

1.75*

1.98*

2.20*

2.65*

2.87*

3.31*

4.64*

6.03*

70

0.86

1.10

1.60*

1.85*

2.09*

2.33*

2.81*

3.05*

3.52*

4.98*

6.50*

80

0.90

1.15

1.68*

1.94*

2.20*

2.45*

2.96*

3.21*

3.72*

5.30*

6.95*

200

5

0.44

0.56

0.81*

0.93*

1.04*

1.15*

1.36*

1.46*

1.66*

2.21*

2.74*

10

0.52

0.67

0.96*

1.10*

1.23*

1.36*

1.61*

1.73*

1.97*

2.64*

3.28*

20

0.63

0.81

1.16*

1.33*

1.49*

1.65*

1.96*

2.11*

2.40*

3.25*

4.06*

30

0.72

0.91

1.31*

1.50*

1.69*

1.87*

2.22*

2.40*

2.73*

3.72*

4.70*

40

0.78

0.99

1.43*

1.64*

1.85*

2.05*

2.45*

2.64*

3.02*

4.14*

5.26*

60

0.89

1.13

1.63*

1.88*

2.12*

2.36*

2.82*

3.05*

3.51*

4.87*

6.27*

70

0.94

1.19

1.72*

1.99*

2.24*

2.49*

2.99*

3.24*

3.73*

5.21*

6.74*

80

0.98

1.24

1.80*

2.08*

2.35*

2.62*

3.15*

3.41*

3.94*

5.53*

7.19*

250

5

0.46

0.59

0.85*

0.97*

1.09*

1.20*

1.42*

1.53*

1.73*

2.31*

2.86*

10

0.55

0.70

1.01*

1.16*

1.30*

1.43*

1.70*

1.82*

2.07*

2.77*

3.43*

20

0.68

0.85

1.23*

1.40*

1.58*

1.74*

2.07*

2.22*

2.53*

3.41*

4.25*

30

0.76

0.97

1.39*

1.59*

1.78*

1.98*

2.35*

2.53*

2.88*

3.90*

4.90*

40

0.83

1.06

1.52*

1.74*

1.96*

2.17*

2.58*

2.78*

3.18*

4.33*

5.48*

60

0.95

1.20

1.73*

1.99*

2.25*

2.49*

2.98*

3.21*

3.68*

5.08*

6.50*

70

1.00

1.27

1.83*

2.10*

2.37*

2.63*

3.15*

3.41*

3.91*

5.42*

6.97*

80

1.05

1.32

1.92*

2.21*

2.49*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.0 m (RADIUS = 0.7 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s)^{1/2}

	1	2	4	5	6	7	9	10	12	18	24
0	0.25	0.37	0.59*	0.70*	0.81*	0.92*	1.14*	1.26*	1.48*	2.14*	2.82*
	0.29	0.42	0.70*	0.84*	0.99*	1.13*	1.41*	1.56*	1.85*	2.75*	3.67*
	0.34	0.52	0.89*	1.08*	1.27*	1.47*	1.87*	2.07*	2.48*	3.77*	5.11*
	0.39	0.61	1.06*	1.29*	1.53*	1.77*	2.27*	2.52*	3.04*	4.66*	6.37*
	0.44	0.69	1.21*	1.48*	1.76*	2.05*	2.63*	2.93*	3.55*	5.48*	7.52*
	0.52	0.83	1.49*	1.83*	2.19*	2.55*	3.30*	3.69*	4.48*	6.98*	9.64*
	0.56	0.90	1.62*	2.00*	2.39*	2.79*	3.61*	4.04*	4.91*	7.68*	10.63*
	0.60	0.96	1.74*	2.16*	2.58*	3.02*	3.92*	4.38*	5.33*	8.36*	11.58*
10	0.35	0.47	0.71*	0.82*	0.93*	1.05*	1.27*	1.38*	1.59*	2.25*	2.92*
	0.40	0.54	0.82*	0.96*	1.10*	1.24*	1.52*	1.67*	1.95*	2.84*	3.76*
	0.47	0.64	1.00*	1.19*	1.38*	1.57*	1.96*	2.16*	2.57*	3.84*	5.18*
	0.53	0.72	1.16*	1.39*	1.62*	1.86*	2.35*	2.60*	3.12*	4.73*	6.43*
	0.58	0.80	1.30*	1.57*	1.85*	2.13*	2.71*	3.01*	3.62*	5.54*	7.58*
	0.66	0.94	1.57*	1.92*	2.27*	2.63*	3.37*	3.76*	4.54*	7.04*	9.69*
	0.70	1.00	1.70*	2.08*	2.46*	2.86*	3.68*	4.11*	4.98*	7.74*	10.68*
	0.73	1.06	1.82*	2.23*	2.65*	3.09*	3.98*	4.45*	5.40*	8.41*	11.63*
20	0.39	0.52	0.77*	0.89*	1.01*	1.13*	1.36*	1.47*	1.69*	2.35*	3.02*
	0.46	0.60	0.90*	1.05*	1.19*	1.33*	1.62*	1.76*	2.05*	2.93*	3.84*
	0.54	0.72	1.09*	1.28*	1.47*	1.66*	2.05*	2.25*	2.66*	3.92*	5.25*
	0.60	0.81	1.25*	1.48*	1.71*	1.95*	2.43*	2.68*	3.19*	4.80*	6.50*
	0.66	0.89	1.39*	1.66*	1.93*	2.21*	2.79*	3.09*	3.69*	5.61*	7.64*
	0.75	1.03	1.66*	2.00*	2.34*	2.70*	3.44*	3.83*	4.61*	7.10*	9.75*
	0.79	1.09	1.78*	2.15*	2.54*	2.93*	3.75*	4.17*	5.04*	7.79*	10.73*
	0.83	1.15	1.90*	2.31*	2.73*	3.16*	4.05*	4.51*	5.46*	8.47*	11.69*
50	0.47	0.61	0.89*	1.03*	1.16*	1.29*	1.54*	1.66*	1.90*	2.60*	3.28*
	0.55	0.71	1.05*	1.21*	1.37*	1.53*	1.83*	1.99*	2.29*	3.18*	4.09*
	0.66	0.86	1.27*	1.48*	1.68*	1.88*	2.28*	2.49*	2.89*	4.15*	5.47*
	0.74	0.97	1.45*	1.69*	1.93*	2.17*	2.66*	2.91*	3.42*	5.01*	6.69*
	0.81	1.06	1.60*	1.88*	2.16*	2.44*	3.01*	3.31*	3.91*	5.81*	7.83*
	0.93	1.22	1.88*	2.22*	2.56*	2.92*	3.65*	4.03*	4.81*	7.28*	9.92*
	0.97	1.29	2.00*	2.37*	2.75*	3.14*	3.95*	4.37*	5.23*	7.97*	10.90*
	1.02	1.36	2.12*	2.52*	2.94*	3.36*	4.24*	4.70*	5.64*	8.63*	11.84*
100	0.54	0.70	1.02*	1.17*	1.32*	1.46*	1.73*	1.87*	2.13*	2.88*	3.60*
	0.65	0.83	1.21*	1.39*	1.57*	1.74*	2.08*	2.24*	2.56*	3.51*	4.45*
	0.79	1.01	1.47*	1.70*	1.92*	2.14*	2.57*	2.79*	3.21*	4.50*	5.81*
	0.89	1.14	1.68*	1.94*	2.20*	2.46*	2.98*	3.23*	3.75*	5.34*	7.02*
	0.97	1.25	1.85*	2.15*	2.44*	2.74*	3.33*	3.63*	4.23*	6.12*	8.13*
	1.11	1.44	2.15*	2.51*	2.87*	3.23*	3.97*	4.35*	5.12*	7.57*	10.19*
	1.17	1.52	2.28*	2.67*	3.06*	3.46*	4.27*	4.68*	5.54*	8.25*	11.16*
	1.23	1.59	2.41*	2.82*	3.25*	3.67*	4.55*	5.01*	5.94*	8.91*	12.10*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.0 m (RADIUS = 0.7 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s)^{1/2}

	1	2	4	5	6	7	9	10	12	18	24
150	0.60	0.77	1.11*	1.27*	1.43*	1.58*	1.88*	2.02*	2.30*	3.09*	3.85*
	0.72	0.92	1.33*	1.52*	1.71*	1.90*	2.26*	2.43*	2.77*	3.77*	4.74*
	0.88	1.12	1.62*	1.87*	2.11*	2.34*	2.80*	3.02*	3.47*	4.79*	6.13*
	0.99	1.27	1.85*	2.13*	2.41*	2.68*	3.22*	3.49*	4.03*	5.65*	7.32*
	1.09	1.39	2.04*	2.35*	2.67*	2.98*	3.59*	3.90*	4.52*	6.43*	8.43*
	1.25	1.60	2.36*	2.74*	3.11*	3.49*	4.25*	4.63*	5.41*	7.85*	10.46*
	1.31	1.69	2.50*	2.91*	3.31*	3.72*	4.55*	4.97*	5.82*	8.53*	11.42*
	1.37	1.77	2.63*	3.07*	3.51*	3.94*	4.84*	5.29*	6.22*	9.18*	12.35*
200	0.64	0.82	1.18*	1.35*	1.52*	1.68*	1.99*	2.14*	2.43*	3.27*	4.05*
	0.77	0.99	1.42*	1.63*	1.83*	2.03*	2.40*	2.59*	2.95*	3.99*	4.99*
	0.95	1.21	1.74*	2.00*	2.26*	2.50*	2.98*	3.22*	3.68*	5.05*	6.41*
	1.08	1.37	1.99*	2.29*	2.58*	2.87*	3.43*	3.71*	4.26*	5.92*	7.61*
	1.18	1.51	2.19*	2.52*	2.85*	3.18*	3.82*	4.14*	4.77*	6.70*	8.71*
	1.35	1.73	2.53*	2.93*	3.32*	3.71*	4.49*	4.89*	5.68*	8.13*	10.73*
	1.43	1.82	2.68*	3.11*	3.53*	3.95*	4.80*	5.23*	6.09*	8.80*	11.68*
	1.50	1.91	2.82*	3.28*	3.73*	4.18*	5.09*	5.55*	6.49*	9.44*	12.61*
250	0.68	0.87	1.24*	1.42*	1.60*	1.77*	2.09*	2.25*	2.55*	3.42*	4.23*
	0.82	1.04	1.50*	1.72*	1.93*	2.14*	2.53*	2.72*	3.10*	4.17*	5.21*
	1.01	1.28	1.85*	2.12*	2.38*	2.64*	3.14*	3.39*	3.87*	5.28*	6.67*
	1.15	1.46	2.10*	2.42*	2.73*	3.03*	3.61*	3.90*	4.47*	6.17*	7.88*
	1.26	1.60	2.32*	2.67*	3.02*	3.35*	4.02*	4.34*	5.00*	6.96*	8.98*
	1.45	1.84	2.68*	3.10*	3.50*	3.91*	4.71*	5.11*	5.92*	8.39*	10.99*
	1.53	1.94	2.84*	3.28*	3.72*	4.16*	5.03*	5.46*	6.34*	9.06*	11.94*
	1.60	2.04	2.99*	3.46*	3.93*	4.39*	5.32*	5.79*	6.74*	9.70*	12.86*
300	0.71	0.91	1.30*	1.49*	1.67*	1.84*	2.18*	2.34*	2.66*	3.55*	4.39*
	0.87	1.10	1.57*	1.80*	2.02*	2.23*	2.64*	2.84*	3.23*	4.34*	5.40*
	1.07	1.35	1.94*	2.22*	2.50*	2.77*	3.28*	3.54*	4.04*	5.48*	6.90*
	1.22	1.54	2.21*	2.54*	2.86*	3.17*	3.78*	4.07*	4.66*	6.40*	8.13*
	1.34	1.69	2.44*	2.80*	3.16*	3.51*	4.19*	4.53*	5.20*	7.20*	9.24*
	1.53	1.94	2.81*	3.25*	3.67*	4.09*	4.91*	5.32*	6.14*	8.64*	11.25*
	1.61	2.05	2.98*	3.44*	3.89*	4.34*	5.23*	5.67*	6.57*	9.31*	12.19*
	1.69	2.15	3.13*	3.62*	4.10*	4.58*	5.53*	6.01*	6.97*	9.95*	13.10*
400	0.77	0.97	1.39*	1.60*	1.79*	1.97*	2.33*	2.50*	2.84*	3.78*	4.67*
	0.94	1.19	1.70*	1.94*	2.17*	2.40*	2.84*	3.05*	3.46*	4.64*	5.75*
	1.16	1.47	2.10*	2.40*	2.70*	2.98*	3.53*	3.80*	4.33*	5.85*	7.32*
	1.33	1.67	2.39*	2.75*	3.08*	3.42*	4.06*	4.37*	4.99*	6.80*	8.59*
	1.46	1.84	2.64*	3.03*	3.41*	3.78*	4.50*	4.86*	5.56*	7.63*	9.71*
	1.67	2.11	3.05*	3.51*	3.93*	4.39*	5.26*	5.69*	6.54*	9.10*	11.73*
	1.77	2.23	3.23*	3.71*	4.19*	4.67*	5.60*	6.06*	6.98*	9.77*	12.67*
	1.85	2.34	3.39*	3.91*	4.42*	4.92*	5.91*	6.41*	7.40*	10.42*	13.58*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.0 m (RADIUS = 0.7 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TEMPERATURE
 TIME INDEX RISE

CEILING HEIGHT, m

(m*s)^{1/2}

		1	2	4	5	6	7	9	10	12	18	24
0	°C	0.37	0.54	0.89*	1.07*	1.25*	1.42*	1.78*	1.96*	2.32*	3.43*	4.57*
	5	0.43	0.66	1.12*	1.35*	1.59*	1.83*	2.32*	2.57*	3.07*	4.64*	6.28*
	10	0.55	0.85	1.49*	1.83*	2.17*	2.52*	3.23*	3.59*	4.34*	6.68*	9.15*
	20	0.64	1.02	1.82*	2.24*	2.68*	3.12*	4.02*	4.49*	5.45*	8.46*	11.67*
	30	0.73	1.18	2.13*	2.63*	3.14*	3.67*	4.76*	5.32*	6.46*	10.10*	13.98*
	40	0.90	1.47	2.68*	3.33*	3.99*	4.68*	6.09*	6.83*	8.33*	13.10*	18.21*
	60	0.98	1.60	2.94*	3.66*	4.39*	5.15*	6.72*	7.53*	9.20*	14.50*	20.19*
	70	1.05	1.73	3.20*	3.97*	4.78*	5.61*	7.32*	8.21*	10.04*	15.86*	22.10*
	80											
10	°C	0.51	0.68	1.03*	1.21*	1.38*	1.56*	1.91*	2.09*	2.44*	3.54*	4.67*
	5	0.59	0.80	1.25*	1.48*	1.71*	1.95*	2.43*	2.68*	3.18*	4.74*	6.36*
	10	0.71	0.99	1.61*	1.93*	2.27*	2.61*	3.32*	3.68*	4.43*	6.76*	9.22*
	20	0.81	1.15	1.93*	2.34*	2.77*	3.21*	4.11*	4.57*	5.52*	8.53*	11.73*
	30	0.90	1.30	2.22*	2.72*	3.23*	3.75*	4.83*	5.39*	6.54*	10.17*	14.04*
	40	1.05	1.58	2.77*	3.41*	4.07*	4.75*	6.17*	6.89*	8.39*	13.16*	18.27*
	60	1.13	1.71	3.03*	3.74*	4.47*	5.22*	6.79*	7.60*	9.26*	14.56*	20.24*
	70	1.20	1.83	3.28*	4.05*	4.85*	5.68*	7.39*	8.28*	10.10*	15.91*	22.15*
	80											
20	°C	0.57	0.75	1.12*	1.31*	1.49*	1.67*	2.02*	2.20*	2.56*	3.65*	4.78*
	5	0.67	0.89	1.35*	1.58*	1.82*	2.06*	2.54*	2.78*	3.28*	4.83*	6.45*
	10	0.81	1.09	1.71*	2.04*	2.37*	2.71*	3.41*	3.77*	4.51*	6.83*	9.30*
	20	0.92	1.26	2.03*	2.44*	2.86*	3.29*	4.19*	4.66*	5.60*	8.60*	11.80*
	30	1.01	1.41	2.32*	2.81*	3.31*	3.83*	4.91*	5.47*	6.61*	10.23*	14.10*
	40	1.18	1.68	2.86*	3.49*	4.15*	4.83*	6.24*	6.96*	8.46*	13.22*	18.32*
	60	1.25	1.81	3.11*	3.82*	4.54*	5.30*	6.86*	7.66*	9.32*	14.62*	20.30*
	70	1.32	1.93	3.36*	4.13*	4.92*	5.75*	7.46*	8.34*	10.16*	15.97*	22.20*
	80											
50	°C	0.68	0.89	1.30*	1.51*	1.70*	1.90*	2.28*	2.47*	2.84*	3.95*	5.07*
	5	0.81	1.06	1.57*	1.82*	2.07*	2.32*	2.81*	3.06*	3.56*	5.10*	6.71*
	10	0.99	1.30	1.96*	2.30*	2.64*	2.98*	3.68*	4.04*	4.77*	7.07*	9.51*
	20	1.13	1.49	2.29*	2.70*	3.12*	3.55*	4.44*	4.90*	5.84*	8.82*	12.00*
	30	1.24	1.65	2.58*	3.06*	3.56*	4.08*	5.14*	5.69*	6.83*	10.43*	14.29*
	40	1.43	1.94	3.10*	3.73*	4.38*	5.05*	6.45*	7.17*	8.66*	13.40*	18.49*
	60	1.52	2.07	3.35*	4.05*	4.77*	5.51*	7.06*	7.86*	9.51*	14.79*	20.46*
	70	1.60	2.19	3.59*	4.35*	5.14*	5.96*	7.65*	8.53*	10.34*	16.14*	22.36*
	80											
100	°C	0.80	1.03	1.49*	1.72*	1.94*	2.15*	2.57*	2.77*	3.17*	4.34*	5.49*
	5	0.96	1.24	1.81*	2.09*	2.36*	2.63*	3.16*	3.42*	3.94*	5.51*	7.12*
	10	1.18	1.53	2.26*	2.62*	2.98*	3.34*	4.06*	4.42*	5.16*	7.45*	9.87*
	20	1.35	1.75	2.61*	3.05*	3.48*	3.92*	4.82*	5.28*	6.21*	9.16*	12.32*
	30	1.48	1.93	2.92*	3.42*	3.93*	4.45*	5.51*	6.06*	7.18*	10.76*	14.59*
	40	1.71	2.25	3.46*	4.09*	4.74*	5.41*	6.79*	7.51*	8.98*	13.70*	18.77*
	60	1.81	2.39	3.71*	4.41*	5.12*	5.86*	7.39*	8.19*	9.83*	15.08*	20.72*
	70	1.90	2.52	3.95*	4.71*	5.49*	6.30*	7.98*	8.85*	10.65*	16.41*	22.62*
	80											

SPACING = 1.0 m (RADIUS = 0.7 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

CEILING HEIGHT, m

RESPONSE TEMPERATURE
TIME INDEX RISE

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	0.88	1.13	1.63*	1.87*	2.11*	2.34*	2.78*	3.00*	3.42*	4.65*	5.84*
	10	1.07	1.37	1.98*	2.29*	2.58*	2.86*	3.42*	3.70*	4.24*	5.86*	7.49*
	20	1.32	1.69	2.48*	2.86*	3.25*	3.62*	4.37*	4.75*	5.50*	7.81*	10.22*
	30	1.51	1.94	2.86*	3.32*	3.78*	4.23*	5.15*	5.61*	6.56*	9.50*	12.65*
	40	1.66	2.14	3.19*	3.71*	4.24*	4.77*	5.85*	6.40*	7.52*	11.08*	14.89*
	60	1.92	2.49	3.75*	4.41*	5.07*	5.74*	7.12*	7.83*	9.30*	13.99*	19.04*
	70	2.03	2.64	4.01*	4.72*	5.45*	6.19*	7.72*	8.51*	10.14*	15.36*	20.99*
	80	2.13	2.78	4.25*	5.03*	5.81*	6.62*	8.29*	9.16*	10.95*	16.69*	22.87*
200	5	0.95	1.21	1.74*	2.00*	2.25*	2.49*	2.96*	3.18*	3.63*	4.90*	6.14*
	10	1.16	1.47	2.13*	2.45*	2.75*	3.06*	3.64*	3.93*	4.50*	6.17*	7.83*
	20	1.43	1.83	2.66*	3.07*	3.47*	3.86*	4.64*	5.02*	5.80*	8.14*	10.56*
	30	1.64	2.09	3.06*	3.55*	4.02*	4.50*	5.44*	5.91*	6.87*	9.83*	12.97*
	40	1.81	2.31	3.41*	3.96*	4.51*	5.05*	6.15*	6.71*	7.84*	11.39*	15.19*
	60	2.08	2.68	4.00*	4.68*	5.35*	6.04*	7.43*	8.15*	9.61*	14.28*	19.32*
	70	2.20	2.84	4.27*	5.00*	5.74*	6.49*	8.03*	8.82*	10.44*	15.64*	21.26*
	80	2.31	3.00	4.52*	5.31*	6.11*	6.92*	8.60*	9.46*	11.25*	16.96*	23.13*
250	5	1.01	1.28	1.84*	2.11*	2.37*	2.62*	3.11*	3.34*	3.80*	5.13*	6.40*
	10	1.23	1.56	2.25*	2.58*	2.91*	3.22*	3.83*	4.13*	4.72*	6.44*	8.13*
	20	1.53	1.94	2.82*	3.24*	3.66*	4.07*	4.87*	5.27*	6.06*	8.44*	10.88*
	30	1.75	2.23	3.24*	3.75*	4.24*	4.73*	5.70*	6.19*	7.16*	10.14*	13.28*
	40	1.93	2.46	3.61*	4.18*	4.74*	5.30*	6.43*	6.99*	8.14*	11.70*	15.49*
	60	2.22	2.85	4.22*	4.92*	5.61*	6.31*	7.72*	8.44*	9.91*	14.57*	19.59*
	70	2.35	3.02	4.50*	5.25*	6.00*	6.77*	8.32*	9.11*	10.74*	15.92*	21.52*
	80	2.47	3.18	4.76*	5.57*	6.38*	7.20*	8.89*	9.76*	11.54*	17.23*	23.39*
300	5	1.06	1.34	1.93*	2.21*	2.48*	2.74*	3.24*	3.49*	3.96*	5.33*	6.63*
	10	1.30	1.64	2.36*	2.71*	3.04*	3.37*	4.00*	4.31*	4.92*	6.68*	8.41*
	20	1.62	2.05	2.95*	3.40*	3.83*	4.25*	5.08*	5.49*	6.30*	8.73*	11.19*
	30	1.85	2.34	3.40*	3.92*	4.44*	4.94*	5.94*	6.43*	7.42*	10.44*	13.58*
	40	2.04	2.59	3.78*	4.37*	4.95*	5.53*	6.68*	7.25*	8.41*	12.00*	15.78*
	60	2.35	3.00	4.42*	5.14*	5.85*	6.56*	7.99*	8.71*	10.19*	14.85*	19.86*
	70	2.49	3.18	4.71*	5.48*	6.25*	7.02*	8.59*	9.39*	11.02*	16.20*	21.78*
	80	2.61	3.35	4.97*	5.80*	6.63*	7.46*	9.17*	10.04*	11.82*	17.50*	23.64*
400	5	1.14	1.45	2.07*	2.37*	2.66*	2.94*	3.47*	3.73*	4.24*	5.68*	7.04*
	10	1.41	1.78	2.55*	2.92*	3.28*	3.63*	4.30*	4.63*	5.27*	7.12*	8.91*
	20	1.76	2.22	3.20*	3.67*	4.13*	4.58*	5.45*	5.88*	6.73*	9.24*	11.75*
	30	2.02	2.55	3.68*	4.24*	4.78*	5.31*	6.35*	6.87*	7.90*	10.99*	14.16*
	40	2.23	2.82	4.09*	4.71*	5.33*	5.93*	7.13*	7.72*	8.92*	12.55*	16.35*
	60	2.57	3.26	4.77*	5.52*	6.26*	7.00*	8.48*	9.22*	10.72*	15.41*	20.40*
	70	2.72	3.46	5.07*	5.88*	6.68*	7.48*	9.09*	9.90*	11.55*	16.74*	22.30*
	80	2.85	3.64	5.35*	6.22*	7.08*	7.94*	9.67*	10.56*	12.35*	18.03*	24.15*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.0 m (RADIUS = 0.7 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	5	0.55	0.83	1.40*	1.69*	1.99*	2.28*	2.89*	3.19*	3.82*	5.74*	7.73*	
	10	0.68	1.06	1.85*	2.26*	2.67*	3.10*	3.97*	4.41*	5.32*	8.16*	11.15*	
	20	0.91	1.45	2.60*	3.21*	3.83*	4.47*	5.78*	6.46*	7.84*	12.23*	16.89*	
	30	1.11	1.79	3.27*	4.04*	4.85*	5.67*	7.38*	8.26*	10.06*	15.80*	21.93*	
	40	1.29	2.11	3.87*	4.81*	5.78*	6.77*	8.84*	9.90*	12.10*	19.07*	26.55*	
	60	1.62	2.68	4.99*	6.21*	7.49*	8.79*	11.52*	12.92*	15.82*	25.07*	35.01*	
	70	1.77	2.95	5.51*	6.87*	8.28*	9.74*	12.77*	14.34*	17.56*	27.88*	38.97*	
	80	1.92	3.21	6.01*	7.50*	9.05*	10.65*	13.98*	15.70*	19.24*	30.58*	42.79*	
10	5	0.74	1.00	1.56*	1.84*	2.13*	2.42*	3.02*	3.32*	3.94*	5.85*	7.84*	
	10	0.88	1.22	1.98*	2.39*	2.80*	3.22*	4.08*	4.52*	5.42*	8.25*	11.24*	
	20	1.10	1.59	2.72*	3.32*	3.94*	4.57*	5.88*	6.55*	7.93*	12.31*	16.96*	
	30	1.29	1.92	3.37*	4.14*	4.94*	5.76*	7.46*	8.34*	10.14*	15.87*	21.99*	
	40	1.46	2.23	3.97*	4.90*	5.87*	6.86*	8.92*	9.98*	12.17*	19.14*	26.61*	
	60	1.78	2.79	5.07*	6.30*	7.56*	8.87*	11.59*	12.99*	15.89*	25.13*	35.07*	
	70	1.93	3.05	5.59*	6.95*	8.36*	9.81*	12.84*	14.40*	17.63*	27.94*	39.03*	
	80	2.07	3.31	6.09*	7.58*	9.13*	10.72*	14.04*	15.76*	19.30*	30.64*	42.84*	
20	5	0.83	1.11	1.68*	1.97*	2.26*	2.55*	3.15*	3.45*	4.06*	5.96*	7.94*	
	10	1.00	1.35	2.11*	2.51*	2.92*	3.33*	4.19*	4.63*	5.52*	8.34*	11.32*	
	20	1.24	1.72	2.83*	3.42*	4.04*	4.67*	5.97*	6.64*	8.02*	12.38*	17.04*	
	30	1.44	2.05	3.47*	4.24*	5.03*	5.85*	7.55*	8.42*	10.22*	15.94*	22.06*	
	40	1.61	2.34	4.07*	4.99*	5.95*	6.94*	9.00*	10.06*	12.24*	19.21*	26.67*	
	60	1.93	2.90	5.16*	6.38*	7.64*	8.95*	11.66*	13.06*	15.95*	25.19*	35.13*	
	70	2.07	3.16	5.67*	7.03*	8.43*	9.89*	12.91*	14.47*	17.69*	27.99*	39.08*	
	80	2.21	3.41	6.17*	7.66*	9.20*	10.79*	14.11*	15.83*	19.37*	30.70*	42.89*	
50	5	1.00	1.31	1.94*	2.25*	2.56*	2.87*	3.48*	3.78*	4.39*	6.28*	8.25*	
	10	1.21	1.59	2.41*	2.82*	3.23*	3.65*	4.50*	4.94*	5.83*	8.62*	11.58*	
	20	1.51	2.01	3.14*	3.73*	4.34*	4.96*	6.25*	6.91*	8.28*	12.62*	17.26*	
	30	1.74	2.35	3.77*	4.52*	5.31*	6.12*	7.80*	8.67*	10.45*	16.15*	22.26*	
	40	1.94	2.66	4.34*	5.26*	6.21*	7.19*	9.23*	10.29*	12.46*	19.40*	26.86*	
	60	2.28	3.20	5.42*	6.62*	7.88*	9.17*	11.87*	13.27*	16.15*	25.37*	35.29*	
	70	2.43	3.46	5.92*	7.26*	8.66*	10.10*	13.11*	14.67*	17.88*	28.17*	39.24*	
	80	2.58	3.70	6.41*	7.88*	9.42*	11.00*	14.31*	16.02*	19.55*	30.86*	43.05*	
100	5	1.18	1.52	2.22*	2.57*	2.90*	3.24*	3.89*	4.21*	4.85*	6.77*	8.73*	
	10	1.44	1.86	2.76*	3.20*	3.64*	4.08*	4.96*	5.40*	6.29*	9.07*	12.01*	
	20	1.80	2.35	3.54*	4.15*	4.77*	5.40*	6.69*	7.35*	8.70*	13.01*	17.62*	
	30	2.07	2.72	4.19*	4.95*	5.74*	6.54*	8.21*	9.07*	10.84*	16.50*	22.59*	
	40	2.30	3.05	4.77*	5.68*	6.62*	7.60*	9.62*	10.66*	12.82*	19.73*	27.16*	
	60	2.68	3.62	5.83*	7.02*	8.26*	9.54*	12.22*	13.61*	16.48*	25.67*	35.57*	
	70	2.85	3.88	6.32*	7.65*	9.03*	10.46*	13.45*	15.00*	18.20*	28.45*	39.51*	
	80	3.01	4.13	6.80*	8.26*	9.78*	11.35*	14.64*	16.34*	19.86*	31.14*	43.31*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.0 m (RADIUS = 0.7 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE
TIME INDEX

TEMPERATURE
RISE

(m*s)^{1/2}

°C

1

2

4

5

6

7

9

10

12

18

24

150

5

1.31

1.67

2.43*

2.80*

3.16*

3.51*

4.20*

4.54*

5.21*

7.19*

9.18*

10

1.61

2.06

3.02*

3.49*

3.96*

4.42*

5.33*

5.78*

6.70*

9.50*

12.43*

20

2.01

2.60

3.86*

4.50*

5.14*

5.78*

7.09*

7.75*

9.10*

13.39*

17.98*

30

2.31

3.01

4.54*

5.32*

6.12*

6.93*

8.60*

9.46*

11.22*

16.85*

22.91*

40

2.57

3.36

5.13*

6.06*

7.01*

7.98*

9.99*

11.03*

13.18*

20.06*

27.47*

60

2.99

3.96

6.20*

7.40*

8.63*

9.91*

12.57*

13.95*

16.81*

25.97*

35.85*

70

3.17

4.23

6.69*

8.02*

9.39*

10.81*

13.79*

15.33*

18.51*

28.74*

39.78*

80

3.35

4.49

7.17*

8.62*

10.13*

11.69*

14.96*

16.66*

20.16*

31.42*

43.57*

200

5

1.41

1.80

2.60*

2.99*

3.37*

3.74*

4.46*

4.81*

5.51*

7.55*

9.58*

10

1.74

2.22

3.23*

3.73*

4.22*

4.70*

5.65*

6.11*

7.05*

9.89*

12.83*

20

2.18

2.80

4.13*

4.80*

5.46*

6.12*

7.45*

8.12*

9.48*

13.77*

18.34*

30

2.51

3.24

4.83*

5.65*

6.46*

7.29*

8.97*

9.83*

11.59*

17.20*

23.24*

40

2.78

3.61

5.45*

6.40*

7.36*

8.34*

10.36*

11.39*

13.53*

20.39*

27.78*

60

3.24

4.25

6.54*

7.75*

8.99*

10.26*

12.91*

14.29*

17.13*

26.27*

36.13*

70

3.44

4.53

7.04*

8.37*

9.74*

11.16*

14.12*

15.65*

18.83*

29.03*

40.04*

250

5

1.50

1.91

2.75*

3.16*

3.55*

3.94*

4.69*

5.05*

5.77*

7.87*

9.94*

10

1.85

2.36

3.42*

3.94*

4.45*

4.95*

5.92*

6.41*

7.37*

10.26*

13.21*

20

2.33

2.97

4.36*

5.05*

5.74*

6.41*

7.77*

8.46*

9.83*

14.13*

18.69*

30

2.68

3.44

5.10*

5.93*

6.77*

7.61*

9.31*

10.17*

11.94*

17.54*

23.57*

40

2.97

3.83

5.73*

6.70*

7.68*

8.67*

10.70*

11.74*

13.88*

20.71*

28.08*

60

3.45

4.50

6.84*

8.07*

9.32*

10.60*

13.25*

14.62*

17.45*

26.56*

36.40*

70

3.66

4.79

7.35*

8.70*

10.08*

11.49*

14.44*

15.97*

19.14*

29.31*

40.31*

300

5

1.58

2.00

2.88*

3.31*

3.72*

4.12*

4.89*

5.27*

6.01*

8.16*

10.27*

10

1.96

2.48

3.59*</

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.5 m (RADIUS = 1.1 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2} 0	5	0.22	0.29	0.44*	0.51*	0.58*	0.66*	0.80*	0.87*	1.01*	1.43*	1.84*
	10	0.24	0.33	0.50*	0.59*	0.68*	0.76*	0.94*	1.03*	1.20*	1.74*	2.28*
	20	0.27	0.38	0.61*	0.72*	0.83*	0.95*	1.18*	1.30*	1.53*	2.26*	3.02*
	30	0.31	0.43	0.70*	0.83*	0.97*	1.11*	1.39*	1.53*	1.82*	2.72*	3.66*
	40	0.33	0.48	0.78*	0.94*	1.10*	1.26*	1.58*	1.75*	2.09*	3.15*	4.25*
	60	0.39	0.57	0.94*	1.13*	1.33*	1.53*	1.94*	2.15*	2.58*	3.92*	5.33*
	70	0.41	0.61	1.01*	1.22*	1.44*	1.65*	2.10*	2.33*	2.80*	4.28*	5.84*
	80	0.44	0.64	1.08*	1.31*	1.54*	1.78*	2.26*	2.51*	3.02*	4.63*	6.33*
10	5	0.30	0.38	0.53*	0.61*	0.69*	0.76*	0.91*	0.98*	1.12*	1.53*	1.95*
	10	0.34	0.43	0.60*	0.69*	0.78*	0.87*	1.04*	1.13*	1.30*	1.83*	2.37*
	20	0.39	0.50	0.71*	0.82*	0.93*	1.04*	1.27*	1.39*	1.62*	2.34*	3.09*
	30	0.43	0.55	0.80*	0.93*	1.06*	1.20*	1.47*	1.62*	1.90*	2.79*	3.73*
	40	0.47	0.60	0.88*	1.03*	1.18*	1.34*	1.66*	1.83*	2.16*	3.21*	4.31*
	60	0.52	0.68	1.02*	1.21*	1.41*	1.60*	2.01*	2.22*	2.64*	3.98*	5.39*
	70	0.55	0.72	1.09*	1.30*	1.51*	1.73*	2.17*	2.40*	2.87*	4.34*	5.89*
	80	0.57	0.75	1.16*	1.38*	1.61*	1.85*	2.33*	2.58*	3.08*	4.68*	6.38*
20	5	0.34	0.42	0.58*	0.66*	0.74*	0.82*	0.97*	1.05*	1.19*	1.62*	2.04*
	10	0.38	0.48	0.66*	0.76*	0.85*	0.94*	1.12*	1.21*	1.39*	1.92*	2.45*
	20	0.45	0.56	0.78*	0.89*	1.01*	1.12*	1.35*	1.47*	1.70*	2.42*	3.16*
	30	0.49	0.62	0.87*	1.01*	1.14*	1.28*	1.55*	1.69*	1.98*	2.86*	3.79*
	40	0.53	0.67	0.95*	1.11*	1.26*	1.42*	1.74*	1.90*	2.23*	3.28*	4.37*
	60	0.60	0.76	1.10*	1.29*	1.48*	1.68*	2.08*	2.29*	2.71*	4.04*	5.45*
	70	0.63	0.80	1.17*	1.37*	1.58*	1.80*	2.24*	2.47*	2.93*	4.39*	5.95*
	80	0.66	0.84	1.24*	1.46*	1.68*	1.92*	2.40*	2.64*	3.15*	4.74*	6.43*
50	5	0.39	0.49	0.66*	0.76*	0.85*	0.93*	1.10*	1.18*	1.34*	1.80*	2.24*
	10	0.46	0.56	0.77*	0.87*	0.98*	1.08*	1.28*	1.38*	1.57*	2.12*	2.67*
	20	0.54	0.67	0.91*	1.04*	1.17*	1.29*	1.54*	1.66*	1.90*	2.63*	3.37*
	30	0.60	0.74	1.02*	1.17*	1.32*	1.46*	1.75*	1.89*	2.18*	3.07*	3.98*
	40	0.66	0.81	1.12*	1.28*	1.45*	1.61*	1.94*	2.10*	2.44*	3.47*	4.56*
	60	0.74	0.92	1.28*	1.48*	1.67*	1.87*	2.27*	2.48*	2.90*	4.21*	5.61*
	70	0.78	0.96	1.35*	1.56*	1.78*	1.99*	2.43*	2.66*	3.12*	4.57*	6.11*
	80	0.81	1.01	1.42*	1.65*	1.88*	2.11*	2.58*	2.83*	3.33*	4.90*	6.59*
100	5	0.45	0.56	0.75*	0.85*	0.95*	1.05*	1.23*	1.32*	1.50*	2.00*	2.47*
	10	0.53	0.65	0.88*	1.00*	1.12*	1.23*	1.45*	1.55*	1.76*	2.36*	2.94*
	20	0.64	0.78	1.05*	1.20*	1.34*	1.48*	1.75*	1.88*	2.14*	2.91*	3.67*
	30	0.72	0.88	1.19*	1.35*	1.51*	1.67*	1.98*	2.14*	2.44*	3.36*	4.28*
	40	0.78	0.96	1.30*	1.48*	1.66*	1.84*	2.19*	2.36*	2.71*	3.76*	4.85*
	60	0.89	1.09	1.48*	1.70*	1.91*	2.12*	2.54*	2.75*	3.18*	4.50*	5.88*
	70	0.93	1.14	1.56*	1.79*	2.02*	2.25*	2.70*	2.93*	3.40*	4.84*	6.37*
	80	0.98	1.20	1.64*	1.88*	2.13*	2.37*	2.86*	3.10*	3.60*	5.17*	6.84*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.5 m (RADIUS = 1.1 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 (m*s) ^{1/2}	5	0.50	0.61	0.82*	0.92*	1.03*	1.13*	1.33*	1.43*	1.61*	2.14*	2.64*	
	10	0.59	0.72	0.96*	1.09*	1.22*	1.34*	1.57*	1.69*	1.91*	2.55*	3.15*	
	20	0.71	0.87	1.16*	1.32*	1.47*	1.62*	1.91*	2.05*	2.32*	3.13*	3.92*	
	30	0.80	0.97	1.31*	1.48*	1.66*	1.83*	2.16*	2.33*	2.65*	3.60*	4.55*	
	40	0.88	1.06	1.43*	1.63*	1.82*	2.01*	2.38*	2.56*	2.93*	4.01*	5.11*	
	60	1.00	1.21	1.63*	1.86*	2.09*	2.31*	2.76*	2.98*	3.42*	4.75*	6.14*	
	70	1.05	1.27	1.72*	1.97*	2.21*	2.45*	2.92*	3.16*	3.64*	5.10*	6.62*	
	80	1.10	1.33	1.81*	2.07*	2.32*	2.58*	3.08*	3.34*	3.85*	5.43*	7.09*	
200	5	0.53	0.65	0.87*	0.98*	1.09*	1.20*	1.41*	1.51*	1.70*	2.26*	2.78*	
	10	0.64	0.77	1.03*	1.16*	1.30*	1.42*	1.67*	1.79*	2.03*	2.69*	3.33*	
	20	0.77	0.93	1.24*	1.41*	1.57*	1.73*	2.03*	2.18*	2.47*	3.31*	4.13*	
	30	0.87	1.05	1.40*	1.59*	1.78*	1.96*	2.31*	2.48*	2.82*	3.80*	4.78*	
	40	0.95	1.15	1.54*	1.75*	1.95*	2.15*	2.54*	2.73*	3.11*	4.23*	5.35*	
	60	1.08	1.31	1.76*	2.00*	2.24*	2.47*	2.94*	3.16*	3.62*	4.99*	6.38*	
	70	1.14	1.38	1.85*	2.11*	2.37*	2.62*	3.11*	3.36*	3.85*	5.33*	6.86*	
	80	1.19	1.44	1.94*	2.22*	2.49*	2.75*	3.28*	3.54*	4.06*	5.66*	7.33*	
250	5	0.56	0.68	0.91*	1.03*	1.15*	1.26*	1.48*	1.58*	1.78*	2.36*	2.90*	
	10	0.67	0.81	1.08*	1.23*	1.37*	1.50*	1.76*	1.88*	2.13*	2.82*	3.48*	
	20	0.82	0.99	1.32*	1.49*	1.66*	1.83*	2.14*	2.30*	2.60*	3.48*	4.32*	
	30	0.93	1.12	1.49*	1.69*	1.88*	2.07*	2.43*	2.61*	2.96*	3.99*	4.98*	
	40	1.02	1.22	1.63*	1.85*	2.06*	2.27*	2.68*	2.88*	3.27*	4.43*	5.57*	
	60	1.16	1.40	1.86*	2.12*	2.37*	2.61*	3.09*	3.33*	3.80*	5.20*	6.61*	
	70	1.22	1.47	1.97*	2.24*	2.50*	2.76*	3.28*	3.53*	4.03*	5.55*	7.09*	
	80	1.28	1.54	2.06*	2.35*	2.63*	2.90*	3.45*	3.72*	4.26*	5.88*	7.56*	
300	5	0.59	0.71	0.95*	1.07*	1.19*	1.31*	1.54*	1.64*	1.85*	2.45*	3.01*	
	10	0.71	0.85	1.13*	1.28*	1.43*	1.57*	1.84*	1.97*	2.22*	2.94*	3.62*	
	20	0.87	1.04	1.38*	1.56*	1.74*	1.91*	2.24*	2.40*	2.72*	3.62*	4.49*	
	30	0.98	1.18	1.56*	1.77*	1.97*	2.17*	2.55*	2.73*	3.10*	4.15*	5.17*	
	40	1.07	1.29	1.71*	1.94*	2.16*	2.38*	2.80*	3.01*	3.42*	4.60*	5.77*	
	60	1.22	1.47	1.96*	2.23*	2.48*	2.74*	3.23*	3.48*	3.96*	5.39*	6.83*	
	70	1.29	1.55	2.07*	2.35*	2.62*	2.89*	3.42*	3.69*	4.20*	5.75*	7.31*	
	80	1.35	1.62	2.16*	2.46*	2.75*	3.04*	3.60*	3.88*	4.43*	6.09*	7.78*	
400	5	0.63	0.76	1.01*	1.15*	1.28*	1.40*	1.64*	1.75*	1.98*	2.60*	3.19*	
	10	0.77	0.92	1.22*	1.38*	1.53*	1.68*	1.97*	2.11*	2.37*	3.14*	3.85*	
	20	0.94	1.13	1.49*	1.69*	1.88*	2.06*	2.41*	2.58*	2.92*	3.87*	4.78*	
	30	1.07	1.28	1.69*	1.91*	2.13*	2.34*	2.74*	2.94*	3.33*	4.43*	5.50*	
	40	1.17	1.40	1.85*	2.10*	2.34*	2.57*	3.02*	3.24*	3.67*	4.91*	6.13*	
	60	1.34	1.60	2.12*	2.41*	2.68*	2.95*	3.48*	3.74*	4.25*	5.74*	7.21*	
	70	1.41	1.69	2.24*	2.54*	2.84*	3.12*	3.68*	3.96*	4.50*	6.11*	7.71*	
	80	1.47	1.77	2.35*	2.66*	2.97*	3.28*	3.87*	4.16*	4.74*	6.46*	8.18*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.5 m (RADIUS = 1.1 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	5	0.31	0.42	0.64*	0.75*	0.86*	0.97*	1.19*	1.31*	1.53*	2.19*	2.87*	
	10	0.35	0.49	0.77*	0.91*	1.05*	1.19*	1.48*	1.63*	1.92*	2.82*	3.74*	
	20	0.42	0.60	0.98*	1.17*	1.36*	1.56*	1.96*	2.16*	2.58*	3.87*	5.21*	
	30	0.48	0.70	1.16*	1.40*	1.64*	1.88*	2.38*	2.64*	3.16*	4.79*	6.50*	
	40	0.54	0.80	1.33*	1.61*	1.89*	2.18*	2.77*	3.07*	3.69*	5.63*	7.68*	
	60	0.65	0.97	1.64*	1.99*	2.35*	2.72*	3.48*	3.87*	4.66*	7.18*	9.85*	
	70	0.70	1.05	1.78*	2.17*	2.57*	2.97*	3.81*	4.24*	5.12*	7.90*	10.86*	
	80	0.74	1.12	1.92*	2.34*	2.78*	3.22*	4.13*	4.60*	5.56*	8.60*	11.84*	
10	5	0.43	0.54	0.76*	0.88*	0.99*	1.10*	1.32*	1.43*	1.65*	2.30*	2.97*	
	10	0.49	0.62	0.89*	1.03*	1.17*	1.31*	1.59*	1.73*	2.02*	2.91*	3.83*	
	20	0.58	0.74	1.09*	1.27*	1.46*	1.66*	2.05*	2.26*	2.67*	3.95*	5.29*	
	30	0.65	0.84	1.26*	1.49*	1.73*	1.97*	2.47*	2.72*	3.24*	4.86*	6.57*	
	40	0.70	0.93	1.43*	1.70*	1.98*	2.26*	2.85*	3.15*	3.76*	5.70*	7.75*	
	60	0.81	1.09	1.73*	2.07*	2.43*	2.79*	3.55*	3.94*	4.73*	7.24*	9.91*	
	70	0.86	1.16	1.87*	2.25*	2.64*	3.05*	3.88*	4.30*	5.18*	7.96*	10.92*	
	80	0.90	1.24	2.01*	2.42*	2.85*	3.29*	4.19*	4.66*	5.62*	8.65*	11.89*	
20	5	0.48	0.60	0.83*	0.95*	1.07*	1.18*	1.41*	1.52*	1.74*	2.41*	3.07*	
	10	0.55	0.69	0.97*	1.11*	1.26*	1.40*	1.69*	1.83*	2.12*	3.00*	3.92*	
	20	0.66	0.83	1.18*	1.37*	1.56*	1.75*	2.14*	2.34*	2.75*	4.02*	5.36*	
	30	0.74	0.93	1.35*	1.58*	1.82*	2.06*	2.55*	2.80*	3.31*	4.93*	6.63*	
	40	0.80	1.03	1.52*	1.78*	2.06*	2.34*	2.92*	3.22*	3.84*	5.76*	7.81*	
	60	0.92	1.19	1.81*	2.15*	2.51*	2.87*	3.62*	4.00*	4.79*	7.30*	9.96*	
	70	0.97	1.27	1.95*	2.33*	2.72*	3.12*	3.94*	4.37*	5.24*	8.02*	10.97*	
	80	1.02	1.34	2.08*	2.50*	2.92*	3.36*	4.26*	4.72*	5.68*	8.71*	11.94*	
50	5	0.57	0.70	0.96*	1.09*	1.22*	1.35*	1.60*	1.72*	1.96*	2.65*	3.33*	
	10	0.67	0.82	1.13*	1.29*	1.45*	1.60*	1.91*	2.06*	2.36*	3.25*	4.16*	
	20	0.80	0.99	1.37*	1.58*	1.78*	1.98*	2.38*	2.58*	2.99*	4.25*	5.57*	
	30	0.91	1.12	1.57*	1.81*	2.05*	2.29*	2.78*	3.03*	3.54*	5.14*	6.83*	
	40	0.99	1.23	1.73*	2.01*	2.29*	2.57*	3.15*	3.44*	4.05*	5.96*	7.99*	
	60	1.13	1.42	2.03*	2.38*	2.73*	3.09*	3.83*	4.21*	4.99*	7.48*	10.13*	
	70	1.19	1.50	2.17*	2.55*	2.93*	3.33*	4.15*	4.57*	5.43*	8.19*	11.13*	
	80	1.25	1.58	2.31*	2.71*	3.13*	3.56*	4.45*	4.92*	5.86*	8.88*	12.10*	
100	5	0.66	0.81	1.09*	1.24*	1.39*	1.53*	1.80*	1.93*	2.19*	2.94*	3.66*	
	10	0.79	0.96	1.30*	1.48*	1.65*	1.82*	2.16*	2.32*	2.64*	3.59*	4.52*	
	20	0.96	1.17	1.59*	1.81*	2.03*	2.25*	2.68*	2.89*	3.32*	4.60*	5.92*	
	30	1.08	1.32	1.81*	2.07*	2.33*	2.59*	3.10*	3.36*	3.87*	5.47*	7.15*	
	40	1.19	1.45	2.00*	2.29*	2.59*	2.88*	3.47*	3.77*	4.38*	6.28*	8.29*	
	60	1.36	1.67	2.32*	2.68*	3.04*	3.41*	4.15*	4.53*	5.31*	7.77*	10.40*	
	70	1.43	1.77	2.47*	2.86*	3.25*	3.65*	4.46*	4.88*	5.74*	8.47*	11.39*	
	80	1.50	1.85	2.60*	3.02*	3.45*	3.88*	4.77*	5.22*	6.16*	9.15*	12.35*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.5 m (RADIUS = 1.1 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s)^{1/2}

	1	2	4	5	6	7	9	10	12	18	24
150	0.73	0.88	1.19*	1.35*	1.50*	1.65*	1.95*	2.09*	2.36*	3.15*	3.91*
	0.87	1.06	1.42*	1.62*	1.80*	1.99*	2.34*	2.52*	2.86*	3.85*	4.82*
	1.07	1.30	1.74*	1.99*	2.22*	2.45*	2.91*	3.13*	3.58*	4.90*	6.24*
	1.21	1.47	1.99*	2.27*	2.54*	2.82*	3.35*	3.62*	4.16*	5.78*	7.46*
	1.33	1.62	2.19*	2.51*	2.82*	3.13*	3.74*	4.05*	4.67*	6.58*	8.59*
	1.52	1.86	2.54*	2.92*	3.30*	3.67*	4.43*	4.82*	5.60*	8.06*	10.67*
	1.60	1.96	2.70*	3.10*	3.51*	3.92*	4.75*	5.17*	6.03*	8.75*	11.66*
	1.68	2.06	2.84*	3.28*	3.72*	4.16*	5.05*	5.51*	6.45*	9.42*	12.61*
200	0.78	0.95	1.27*	1.44*	1.60*	1.76*	2.01*	2.21*	2.50*	3.33*	4.12*
	0.94	1.14	1.52*	1.73*	1.93*	2.12*	2.50*	2.68*	3.04*	4.07*	5.07*
	1.16	1.40	1.87*	2.13*	2.38*	2.62*	3.10*	3.33*	3.79*	5.16*	6.52*
	1.31	1.59	2.13*	2.43*	2.72*	3.01*	3.57*	3.85*	4.40*	6.06*	7.75*
	1.44	1.75	2.35*	2.69*	3.01*	3.34*	3.97*	4.29*	4.93*	6.86*	8.87*
	1.65	2.01	2.73*	3.12*	3.51*	3.90*	4.68*	5.08*	5.87*	8.33*	10.94*
	1.74	2.12	2.89*	3.31*	3.74*	4.16*	5.01*	5.43*	6.30*	9.02*	11.92*
	1.83	2.23	3.04*	3.50*	3.95*	4.40*	5.31*	5.78*	6.72*	9.69*	12.86*
250	0.83	1.00	1.33*	1.51*	1.68*	1.85*	2.17*	2.32*	2.63*	3.48*	4.30*
	1.00	1.21	1.61*	1.83*	2.03*	2.24*	2.63*	2.82*	3.19*	4.26*	5.29*
	1.23	1.49	1.98*	2.25*	2.51*	2.77*	3.26*	3.51*	3.99*	5.39*	6.78*
	1.40	1.69	2.26*	2.57*	2.88*	3.17*	3.76*	4.04*	4.61*	6.31*	8.02*
	1.54	1.86	2.50*	2.84*	3.18*	3.52*	4.18*	4.50*	5.16*	7.12*	9.14*
	1.77	2.14	2.89*	3.30*	3.70*	4.11*	4.91*	5.31*	6.11*	8.60*	11.21*
	1.86	2.26	3.06*	3.50*	3.94*	4.37*	5.24*	5.67*	6.55*	9.28*	12.17*
	1.95	2.37	3.22*	3.69*	4.15*	4.62*	5.55*	6.02*	6.97*	9.95*	13.11*
300	0.87	1.05	1.39*	1.58*	1.76*	1.93*	2.26*	2.42*	2.73*	3.62*	4.46*
	1.05	1.27	1.69*	1.91*	2.13*	2.34*	2.74*	2.94*	3.33*	4.43*	5.49*
	1.30	1.57	2.08*	2.36*	2.63*	2.90*	3.41*	3.66*	4.16*	5.60*	7.02*
	1.48	1.78	2.37*	2.70*	3.01*	3.32*	3.92*	4.22*	4.80*	6.54*	8.27*
	1.63	1.96	2.62*	2.98*	3.33*	3.68*	4.36*	4.70*	5.36*	7.37*	9.40*
	1.87	2.26	3.03*	3.46*	3.87*	4.29*	5.11*	5.52*	6.34*	8.85*	11.46*
	1.97	2.38	3.21*	3.66*	4.11*	4.56*	5.45*	5.89*	6.78*	9.53*	12.43*
	2.06	2.50	3.37*	3.86*	4.34*	4.82*	5.77*	6.24*	7.21*	10.20*	13.36*
400	0.94	1.13	1.50*	1.69*	1.88*	2.06*	2.42*	2.59*	2.92*	3.86*	4.74*
	1.14	1.37	1.82*	2.06*	2.29*	2.51*	2.94*	3.15*	3.56*	4.73*	5.84*
	1.42	1.70	2.25*	2.55*	2.84*	3.12*	3.67*	3.93*	4.46*	5.97*	7.44*
	1.62	1.94	2.57*	2.92*	3.25*	3.58*	4.22*	4.53*	5.14*	6.95*	8.73*
	1.78	2.14	2.84*	3.22*	3.60*	3.96*	4.68*	5.03*	5.73*	7.80*	9.88*
	2.04	2.46	3.28*	3.73*	4.17*	4.61*	5.47*	5.90*	6.75*	9.31*	11.95*
	2.15	2.59	3.47*	3.95*	4.43*	4.90*	5.82*	6.28*	7.20*	10.00*	12.91*
	2.26	2.72	3.65*	4.16*	4.67*	5.16*	6.15*	6.65*	7.64*	10.67*	13.84*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.5 m (RADIUS = 1.1 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE	CEILING HEIGHT, m												
			1	2	4	5	6	7	9	10	12	18	24		
(m*s) ^{1/2}	0	°C													
		5	0.45	0.62	0.97*	1.15*	1.33*	1.50*	1.86*	2.04*	2.41*	3.52*	4.66*		
		10	0.53	0.76	1.22*	1.46*	1.70*	1.94*	2.43*	2.68*	3.19*	4.77*	6.41*		
		20	0.68	0.99	1.64*	1.98*	2.32*	2.67*	3.39*	3.76*	4.51*	6.86*	9.34*		
		30	0.80	1.19	2.01*	2.44*	2.87*	3.32*	4.24*	4.71*	5.67*	8.70*	11.92*		
		40	0.92	1.38	2.35*	2.86*	3.38*	3.91*	5.01*	5.57*	6.73*	10.39*	14.29*		
		60	1.13	1.72	2.97*	3.62*	4.30*	4.99*	6.43*	7.16*	8.68*	13.48*	18.62*		
		70	1.22	1.88	3.26*	3.98*	4.73*	5.50*	7.09*	7.91*	9.59*	14.93*	20.64*		
10	80	1.32	2.03	3.54*	4.33*	5.15*	5.99*	7.73*	8.62*	10.46*	16.32*	22.60*			
	5	0.62	0.78	1.11*	1.29*	1.46*	1.64*	1.99*	2.17*	2.53*	3.63*	4.76*			
	10	0.72	0.92	1.35*	1.58*	1.82*	2.06*	2.54*	2.79*	3.29*	4.86*	6.49*			
	20	0.87	1.14	1.76*	2.09*	2.43*	2.77*	3.49*	3.85*	4.60*	6.94*	9.42*			
	30	0.99	1.34	2.11*	2.53*	2.97*	3.41*	4.32*	4.79*	5.75*	8.77*	11.99*			
	40	1.10	1.51	2.44*	2.95*	3.46*	3.99*	5.09*	5.65*	6.80*	10.46*	14.35*			
	60	1.30	1.84	3.05*	3.71*	4.38*	5.07*	6.50*	7.23*	8.74*	13.54*	18.67*			
	70	1.40	2.00	3.34*	4.06*	4.81*	5.57*	7.16*	7.97*	9.65*	14.99*	20.70*			
20	80	1.49	2.15	3.62*	4.41*	5.22*	6.06*	7.79*	8.69*	10.53*	16.38*	22.65*			
	5	0.69	0.86	1.21*	1.39*	1.57*	1.75*	2.11*	2.29*	2.64*	3.74*	4.86*			
	10	0.81	1.03	1.46*	1.70*	1.93*	2.17*	2.65*	2.90*	3.40*	4.95*	6.58*			
	20	0.99	1.26	1.86*	2.19*	2.53*	2.87*	3.58*	3.94*	4.68*	7.02*	9.49*			
	30	1.12	1.46	2.21*	2.63*	3.06*	3.50*	4.40*	4.87*	5.83*	8.84*	12.05*			
	40	1.24	1.64	2.54*	3.04*	3.55*	4.08*	5.17*	5.73*	6.88*	10.52*	14.41*			
	60	1.45	1.96	3.14*	3.79*	4.46*	5.14*	6.57*	7.30*	8.81*	13.60*	18.73*			
	70	1.54	2.11	3.42*	4.14*	4.88*	5.65*	7.23*	8.04*	9.71*	15.04*	20.75*			
50	80	1.63	2.26	3.70*	4.48*	5.29*	6.13*	7.86*	8.75*	10.59*	16.44*	22.70*			
	5	0.83	1.02	1.40*	1.60*	1.80*	1.99*	2.37*	2.56*	2.93*	4.04*	5.16*			
	10	0.99	1.22	1.69*	1.94*	2.19*	2.44*	2.93*	3.18*	3.68*	5.22*	6.84*			
	20	1.21	1.51	2.12*	2.46*	2.80*	3.14*	3.85*	4.21*	4.94*	7.25*	9.71*			
	30	1.38	1.73	2.48*	2.90*	3.32*	3.76*	4.65*	5.11*	6.06*	9.06*	12.25*			
	40	1.52	1.92	2.80*	3.30*	3.80*	4.32*	5.40*	5.95*	7.10*	10.72*	14.59*			
	60	1.76	2.26	3.39*	4.03*	4.69*	5.37*	6.78*	7.51*	9.01*	13.78*	18.90*			
	70	1.86	2.41	3.67*	4.37*	5.11*	5.86*	7.43*	8.24*	9.91*	15.22*	20.91*			
100	80	1.96	2.56	3.93*	4.71*	5.51*	6.34*	8.06*	8.94*	10.77*	16.60*	22.86*			
	5	0.97	1.18	1.61*	1.83*	2.04*	2.25*	2.67*	2.87*	3.27*	4.43*	5.58*			
	10	1.17	1.43	1.95*	2.22*	2.49*	2.76*	3.29*	3.55*	4.07*	5.64*	7.25*			
	20	1.44	1.77	2.43*	2.79*	3.15*	3.51*	4.23*	4.60*	5.33*	7.63*	10.07*			
	30	1.64	2.03	2.82*	3.26*	3.69*	4.14*	5.04*	5.49*	6.43*	9.40*	12.58*			
	40	1.81	2.25	3.16*	3.66*	4.18*	4.70*	5.77*	6.32*	7.45*	11.05*	14.90*			
	60	2.09	2.62	3.76*	4.40*	5.06*	5.73*	7.13*	7.85*	9.33*	14.08*	19.17*			
	70	2.21	2.79	4.03*	4.74*	5.47*	6.21*	7.76*	8.57*	10.22*	15.50*	21.18*			
80	2.33	2.94	4.30*	5.07*	5.86*	6.68*	8.38*	9.26*	11.08*	16.88*	23.11*				

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.5 m (RADIUS = 1.1 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	1.07	1.30	1.75*	1.99*	2.22*	2.45*	2.89*	3.10*	3.52*	4.74*	5.93*
	10	1.30	1.58	2.13*	2.43*	2.72*	3.00*	3.56*	3.83*	4.38*	5.99*	7.62*
	20	1.61	1.96	2.67*	3.05*	3.43*	3.81*	4.55*	4.93*	5.68*	7.99*	10.42*
	30	1.84	2.25	3.08*	3.54*	4.00*	4.45*	5.37*	5.84*	6.78*	9.75*	12.90*
	40	2.03	2.49	3.44*	3.97*	4.50*	5.03*	6.11*	6.66*	7.79*	11.37*	15.20*
	60	2.34	2.90	4.06*	4.72*	5.39*	6.06*	7.46*	8.18*	9.65*	14.37*	19.45*
	70	2.48	3.07	4.35*	5.06*	5.80*	6.54*	8.09*	8.89*	10.53*	15.79*	21.44*
	80	2.60	3.24	4.62*	5.40*	6.19*	7.01*	8.70*	9.57*	11.38*	17.15*	23.37*
200	5	1.15	1.40	1.87*	2.12*	2.37*	2.61*	3.07*	3.29*	3.73*	5.00*	6.23*
	10	1.41	1.71	2.29*	2.60*	2.90*	3.20*	3.79*	4.07*	4.64*	6.30*	7.96*
	20	1.75	2.12	2.86*	3.26*	3.66*	4.05*	4.83*	5.21*	5.98*	8.33*	10.76*
	30	2.00	2.43	3.30*	3.78*	4.26*	4.73*	5.67*	6.14*	7.10*	10.07*	13.22*
	40	2.20	2.69	3.68*	4.23*	4.77*	5.32*	6.42*	6.98*	8.11*	11.69*	15.50*
	60	2.54	3.12	4.33*	5.00*	5.68*	6.37*	7.77*	8.49*	9.96*	14.67*	19.72*
	70	2.69	3.31	4.62*	5.35*	6.10*	6.85*	8.40*	9.20*	10.83*	16.07*	21.71*
	80	2.83	3.49	4.90*	5.69*	6.49*	7.31*	9.01*	9.88*	11.68*	17.43*	23.63*
250	5	1.22	1.48	1.97*	2.24*	2.49*	2.74*	3.22*	3.46*	3.92*	5.23*	6.50*
	10	1.50	1.81	2.42*	2.75*	3.06*	3.38*	3.98*	4.28*	4.86*	6.58*	8.27*
	20	1.86	2.26	3.03*	3.45*	3.86*	4.27*	5.07*	5.47*	6.26*	8.64*	11.08*
	30	2.13	2.59	3.49*	3.99*	4.48*	4.97*	5.94*	6.42*	7.39*	10.39*	13.53*
	40	2.35	2.86	3.89*	4.45*	5.02*	5.58*	6.70*	7.27*	8.41*	11.99*	15.80*
	60	2.72	3.32	4.56*	5.25*	5.95*	6.65*	8.06*	8.79*	10.26*	14.95*	20.00*
	70	2.87	3.52	4.86*	5.61*	6.37*	7.13*	8.69*	9.49*	11.13*	16.35*	21.97*
	80	3.02	3.71	5.15*	5.96*	6.77*	7.60*	9.30*	10.17*	11.97*	17.70*	23.88*
300	5	1.29	1.55	2.07*	2.34*	2.61*	2.86*	3.36*	3.61*	4.08*	5.44*	6.74*
	10	1.58	1.90	2.53*	2.88*	3.21*	3.53*	4.16*	4.46*	5.07*	6.83*	8.55*
	20	1.97	2.37	3.18*	3.61*	4.04*	4.46*	5.29*	5.69*	6.50*	8.93*	11.39*
	30	2.25	2.72	3.66*	4.18*	4.68*	5.19*	6.18*	6.67*	7.66*	10.69*	13.84*
	40	2.49	3.01	4.07*	4.66*	5.24*	5.81*	6.96*	7.53*	8.70*	12.29*	16.09*
	60	2.87	3.50	4.77*	5.48*	6.19*	6.90*	8.34*	9.07*	10.55*	15.24*	20.27*
	70	3.04	3.71	5.08*	5.85*	6.62*	7.40*	8.97*	9.77*	11.42*	16.63*	22.23*
	80	3.19	3.90	5.37*	6.20*	7.03*	7.87*	9.58*	10.46*	12.25*	17.97*	24.14*
400	5	1.39	1.68	2.22*	2.52*	2.80*	3.07*	3.60*	3.86*	4.36*	5.79*	7.15*
	10	1.72	2.06	2.74*	3.10*	3.45*	3.80*	4.46*	4.79*	5.42*	7.27*	9.06*
	20	2.15	2.58	3.43*	3.90*	4.35*	4.80*	5.67*	6.10*	6.94*	9.45*	11.96*
	30	2.46	2.96	3.96*	4.50*	5.04*	5.57*	6.61*	7.12*	8.15*	11.24*	14.42*
	40	2.72	3.28	4.40*	5.02*	5.63*	6.23*	7.42*	8.02*	9.21*	12.85*	16.66*
	60	3.14	3.80	5.14*	5.89*	6.62*	7.36*	8.84*	9.58*	11.09*	15.79*	20.80*
	70	3.32	4.03	5.47*	6.27*	7.07*	7.87*	9.48*	10.30*	11.96*	17.17*	22.75*
	80	3.48	4.24	5.77*	6.63*	7.49*	8.36*	10.10*	10.99*	12.79*	18.50*	24.64*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.5 m (RADIUS = 1.1 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	°C												
	5	0.68	0.96	1.53*	1.82*	2.12*	2.42*	3.03*	3.33*	3.96*	5.89*	7.89*	
	10	0.85	1.23	2.03*	2.44*	2.87*	3.29*	4.17*	4.62*	5.53*	8.38*	11.39*	
	20	1.13	1.69	2.87*	3.49*	4.12*	4.76*	6.09*	6.77*	8.17*	12.58*	17.26*	
	30	1.38	2.10	3.61*	4.40*	5.22*	6.05*	7.78*	8.66*	10.48*	16.25*	22.41*	
	40	1.61	2.47	4.28*	5.24*	6.22*	7.23*	9.32*	10.40*	12.61*	19.63*	27.14*	
	60	2.03	3.15	5.52*	6.78*	8.07*	9.40*	12.16*	13.58*	16.50*	25.82*	35.81*	
	70	2.23	3.47	6.10*	7.50*	8.93*	10.41*	13.48*	15.06*	18.32*	28.71*	39.86*	
10	80	2.42	3.77	6.66*	8.19*	9.77*	11.39*	14.76*	16.50*	20.08*	31.50*	43.77*	
	5	0.90	1.15	1.69*	1.97*	2.26*	2.56*	3.16*	3.46*	4.08*	6.00*	7.99*	
	10	1.08	1.42	2.17*	2.57*	2.99*	3.41*	4.28*	4.72*	5.63*	8.48*	11.47*	
	20	1.36	1.85	2.99*	3.60*	4.22*	4.86*	6.18*	6.86*	8.26*	12.66*	17.34*	
	30	1.59	2.25	3.71*	4.50*	5.31*	6.14*	7.86*	8.75*	10.56*	16.33*	22.48*	
	40	1.81	2.61	4.38*	5.33*	6.31*	7.32*	9.40*	10.48*	12.68*	19.70*	27.21*	
	60	2.21	3.27	5.61*	6.86*	8.15*	9.48*	12.23*	13.65*	16.57*	25.88*	35.86*	
	70	2.40	3.59	6.19*	7.58*	9.01*	10.49*	13.55*	15.13*	18.38*	28.77*	39.91*	
20	80	2.59	3.89	6.74*	8.27*	9.84*	11.46*	14.82*	16.56*	20.14*	31.55*	43.82*	
	5	1.01	1.27	1.82*	2.11*	2.40*	2.69*	3.29*	3.59*	4.20*	6.11*	8.10*	
	10	1.22	1.56	2.29*	2.70*	3.11*	3.53*	4.39*	4.83*	5.73*	8.57*	11.56*	
	20	1.52	2.00	3.10*	3.70*	4.32*	4.96*	6.28*	6.95*	8.34*	12.73*	17.41*	
	30	1.77	2.39	3.81*	4.60*	5.40*	6.23*	7.94*	8.83*	10.64*	16.40*	22.55*	
	40	1.99	2.74	4.48*	5.42*	6.40*	7.40*	9.48*	10.55*	12.76*	19.76*	27.27*	
	60	2.39	3.40	5.70*	6.94*	8.23*	9.55*	12.30*	13.72*	16.63*	25.94*	35.92*	
	70	2.57	3.71	6.27*	7.65*	9.09*	10.56*	13.62*	15.20*	18.45*	28.82*	39.97*	
50	80	2.75	4.01	6.82*	8.34*	9.91*	11.53*	14.89*	16.63*	20.20*	31.61*	43.87*	
	5	1.22	1.51	2.09*	2.40*	2.71*	3.01*	3.62*	3.93*	4.54*	6.43*	8.40*	
	10	1.48	1.85	2.60*	3.02*	3.43*	3.85*	4.71*	5.14*	6.04*	8.85*	11.82*	
	20	1.85	2.34	3.41*	4.01*	4.62*	5.25*	6.55*	7.22*	8.60*	12.97*	17.63*	
	30	2.13	2.74	4.11*	4.88*	5.68*	6.50*	8.20*	9.07*	10.88*	16.61*	22.74*	
	40	2.37	3.10	4.76*	5.69*	6.66*	7.65*	9.71*	10.78*	12.97*	19.96*	27.45*	
	60	2.80	3.75	5.95*	7.19*	8.46*	9.78*	12.51*	13.92*	16.83*	26.12*	36.09*	
	70	2.99	4.05	6.52*	7.89*	9.31*	10.78*	13.82*	15.40*	18.64*	29.00*	40.13*	
100	80	3.18	4.34	7.06*	8.57*	10.13*	11.74*	15.09*	16.82*	20.38*	31.78*	44.03*	
	5	1.43	1.76	2.39*	2.73*	3.07*	3.39*	4.04*	4.36*	5.00*	6.92*	8.89*	
	10	1.76	2.16	2.97*	3.41*	3.85*	4.29*	5.17*	5.61*	6.51*	9.30*	12.25*	
	20	2.20	2.73	3.83*	4.45*	5.07*	5.70*	7.00*	7.66*	9.02*	13.36*	17.99*	
	30	2.53	3.17	4.55*	5.32*	6.11*	6.92*	8.61*	9.48*	11.26*	16.96*	23.07*	
	40	2.81	3.56	5.19*	6.12*	7.07*	8.06*	10.10*	11.16*	13.34*	20.29*	27.76*	
	60	3.29	4.23	6.37*	7.59*	8.85*	10.15*	12.86*	14.27*	17.16*	26.42*	36.37*	
	70	3.50	4.54	6.92*	8.28*	9.68*	11.14*	14.16*	15.73*	18.96*	29.28*	40.40*	
80	3.70	4.83	7.46*	8.95*	10.49*	12.09*	15.42*	17.14*	20.69*	32.06*	44.28*		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.5 m (RADIUS = 1.1 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	1.59	1.94	2.62*	2.98*	3.33*	3.68*	4.36*	4.70*	5.37*	7.35*	9.34*
	10	1.96	2.39	3.25*	3.72*	4.18*	4.64*	5.55*	6.00*	6.92*	9.73*	12.66*
	20	2.45	3.02	4.17*	4.81*	5.45*	6.09*	7.40*	8.07*	9.43*	13.74*	18.35*
	30	2.83	3.50	4.91*	5.70*	6.51*	7.32*	9.00*	9.87*	11.64*	17.31*	23.40*
	40	3.14	3.91	5.57*	6.51*	7.46*	8.45*	10.48*	11.53*	13.69*	20.62*	28.07*
	60	3.66	4.62	6.75*	7.97*	9.22*	10.51*	13.21*	14.61*	17.49*	26.71*	36.64*
	70	3.89	4.94	7.30*	8.65*	10.05*	11.49*	14.50*	16.06*	19.27*	29.57*	40.66*
	80	4.10	5.25	7.83*	9.31*	10.85*	12.43*	15.74*	17.46*	21.00*	32.33*	44.54*
200	5	1.72	2.08	2.80*	3.18*	3.56*	3.92*	4.63*	4.99*	5.68*	7.71*	9.74*
	10	2.12	2.58	3.48*	3.97*	4.45*	4.93*	5.87*	6.34*	7.28*	10.12*	13.07*
	20	2.66	3.25	4.45*	5.12*	5.78*	6.44*	7.77*	8.44*	9.81*	14.12*	18.71*
	30	3.07	3.77	5.23*	6.04*	6.86*	7.68*	9.37*	10.24*	12.01*	17.66*	23.73*
	40	3.40	4.21	5.90*	6.86*	7.82*	8.81*	10.84*	11.89*	14.05*	20.95*	28.37*
	60	3.96	4.95	7.10*	8.32*	9.58*	10.87*	13.55*	14.94*	17.81*	27.01*	36.92*
	70	4.21	5.29	7.66*	9.01*	10.40*	11.84*	14.83*	16.38*	19.58*	29.86*	40.93*
	80	4.44	5.60	8.19*	9.67*	11.19*	12.77*	16.07*	17.77*	21.30*	32.61*	44.80*
250	5	1.82	2.21	2.95*	3.36*	3.75*	4.13*	4.87*	5.23*	5.95*	8.04*	10.11*
	10	2.26	2.74	3.68*	4.19*	4.69*	5.19*	6.16*	6.64*	7.60*	10.49*	13.45*
	20	2.84	3.46	4.70*	5.39*	6.07*	6.74*	8.10*	8.79*	10.17*	14.48*	19.06*
	30	3.27	4.00	5.50*	6.34*	7.17*	8.02*	9.72*	10.59*	12.37*	18.00*	24.05*
	40	3.63	4.46	6.20*	7.17*	8.16*	9.15*	11.19*	12.24*	14.39*	21.27*	28.68*
	60	4.23	5.24	7.42*	8.66*	9.92*	11.21*	13.89*	15.28*	18.13*	27.30*	37.20*
	70	4.48	5.59	7.98*	9.34*	10.74*	12.17*	15.16*	16.70*	19.90*	30.14*	41.20*
	80	4.73	5.92	8.52*	10.00*	11.53*	13.10*	16.39*	18.09*	21.60*	32.89*	45.06*
300	5	1.92	2.32	3.09*	3.51*	3.91*	4.31*	5.08*	5.45*	6.19*	8.34*	10.44*
	10	2.38	2.88	3.86*	4.39*	4.91*	5.42*	6.42*	6.91*	7.90*	10.83*	13.82*
	20	3.00	3.64	4.92*	5.63*	6.33*	7.02*	8.41*	9.10*	10.50*	14.84*	19.41*
	30	3.46	4.21	5.75*	6.61*	7.46*	8.32*	10.05*	10.93*	12.71*	18.34*	24.38*
	40	3.83	4.69	6.47*	7.46*	8.46*	9.47*	11.53*	12.58*	14.73*	21.59*	28.98*
	60	4.46	5.51	7.72*	8.97*	10.24*	11.54*	14.22*	15.60*	18.45*	27.60*	37.47*
	70	4.73	5.86	8.28*	9.66*	11.06*	12.50*	15.48*	17.02*	20.20*	30.42*	41.46*
	80	4.98	6.20	8.82*	10.32*	11.85*	13.43*	16.70*	18.40*	21.90*	33.16*	45.32*
400	5	2.08	2.51	3.33*	3.78*	4.21*	4.63*	5.44*	5.84*	6.61*	8.86*	11.04*
	10	2.59	3.12	4.16*	4.73*	5.28*	5.82*	6.87*	7.39*	8.42*	11.45*	14.50*
	20	3.27	3.95	5.31*	6.06*	6.79*	7.52*	8.96*	9.68*	11.11*	15.51*	20.09*
	30	3.77	4.57	6.19*	7.09*	7.98*	8.87*	10.64*	11.54*	13.35*	19.00*	25.01*
	40	4.18	5.09	6.94*	7.98*	9.01*	10.05*	12.14*	13.21*	15.37*	22.22*	29.58*
	60	4.86	5.96	8.24*	9.53*	10.83*	12.15*	14.84*	16.23*	19.07*	28.18*	38.02*
	70	5.16	6.34	8.83*	10.24*	11.66*	13.11*	16.10*	17.64*	20.81*	30.99*	41.99*
	80	5.43	6.70	9.38*	10.91*	12.46*	14.04*	17.32*	19.01*	22.50*	33.71*	45.83*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 m (RADIUS = 1.4 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX
TEMPERATURE RISE

CEILING HEIGHT, m

(m*s)^{1/2}

°C

1

2

4

5

6

7

9

10

12

18

24

0

5

0.26

0.33

0.47

0.55*

0.62*

0.69*

0.83*

0.90*

1.04*

1.46*

1.88*

10

0.28

0.37

0.54

0.63*

0.72*

0.80*

0.98*

1.07*

1.25*

1.78*

2.32*

20

0.33

0.43

0.66

0.77*

0.89*

1.00*

1.23*

1.59*

1.89*

2.32*

3.07*

30

0.36

0.49

0.76

0.90*

1.03*

1.17*

1.46*

1.60*

1.89*

2.79*

3.73*

40

0.40

0.55

0.85

1.01*

1.17*

1.33*

1.66*

1.83*

2.17*

3.23*

4.34*

60

0.46

0.64

1.02

1.22*

1.42*

1.62*

2.03*

2.24*

2.68*

4.02*

5.45*

70

0.49

0.69

1.10

1.32*

1.53*

1.75*

2.21*

2.44*

2.91*

4.40*

5.96*

80

0.52

0.73

1.18

1.41*

1.65*

1.88*

2.38*

2.63*

3.14*

4.76*

6.46*

10

5

0.35

0.43

0.57

0.65*

0.72*

0.79*

0.94*

1.01*

1.15*

1.57*

1.98*

10

0.40

0.48

0.65

0.73*

0.82*

0.91*

1.08*

1.17*

1.34*

1.87*

2.41*

20

0.46

0.56

0.77

0.87*

0.98*

1.10*

1.33*

1.44*

1.68*

2.40*

3.15*

30

0.51

0.62

0.86

0.99*

1.12*

1.26*

1.54*

1.68*

1.97*

2.86*

3.80*

40

0.55

0.67

0.95

1.10*

1.25*

1.41*

1.74*

1.90*

2.24*

3.29*

4.40*

60

0.61

0.77

1.11

1.30*

1.50*

1.69*

2.10*

2.31*

2.74*

4.08*

5.50*

70

0.65

0.81

1.19

1.39*

1.61*

1.83*

2.28*

2.51*

2.98*

4.45*

6.02*

80

0.67

0.85

1.26

1.49*

1.72*

1.95*

2.44*

2.69*

3.20*

4.81*

6.51*

20

5

0.39

0.47

0.62

0.70*

0.78*

0.86*

1.01*

1.08*

1.23*

1.65*

2.07*

10

0.45

0.54

0.71

0.80*

0.89*

0.98*

1.16*

1.25*

1.43*

1.96*

2.49*

20

0.52

0.63

0.84

0.95*

1.06*

1.18*

1.41*

1.52*

1.76*

2.48*

3.22*

30

0.58

0.70

0.94

1.07*

1.21*

1.34*

1.62*

1.76*

2.05*

2.93*

3.86*

40

0.62

0.76

1.03

1.18*

1.33*

1.49*

1.81*

1.98*

2.31*

3.36*

4.46*

60

0.70

0.86

1.20

1.38*

1.57*

1.77*

2.17*

2.38*

2.81*

4.14*

5.56*

70

0.74

0.91

1.27

1.47*

1.68*

1.90*

2.34*

2.57*

3.04*

4.51*

6.07*

80

0.77

0.95

1.35

1.56*

1.79*

2.02*

2.51*

2.76*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 m (RADIUS = 1.4 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE	CEILING HEIGHT, m											
			1	2	4	5	6	7	9	10	12	18	24	
150	°C	5	0.58	0.68	0.88	0.98*	1.08*	1.18*	1.38*	1.47*	1.66*	2.18*	2.68*	
		10	0.69	0.81	1.04	1.15*	1.28*	1.40*	1.63*	1.74*	1.96*	2.60*	3.20*	
		20	0.83	0.98	1.25	1.39*	1.54*	1.69*	1.97*	2.11*	2.39*	3.19*	3.98*	
		30	0.94	1.10	1.42	1.57*	1.74*	1.91*	2.24*	2.40*	2.73*	3.67*	4.62*	
		40	1.03	1.20	1.55	1.72*	1.91*	2.10*	2.47*	2.65*	3.02*	4.10*	5.20*	
		60	1.17	1.37	1.77	1.97*	2.20*	2.42*	2.86*	3.08*	3.52*	4.86*	6.25*	
		70	1.23	1.44	1.87	2.09*	2.33*	2.56*	3.04*	3.28*	3.75*	5.22*	6.75*	
		80	1.28	1.51	1.96	2.19*	2.45*	2.70*	3.21*	3.46*	3.97*	5.56*	7.22*	
200	°C	5	0.62	0.73	0.94	1.04*	1.15*	1.25*	1.46*	1.56*	1.75*	2.30*	2.82*	
		10	0.74	0.87	1.11	1.23*	1.36*	1.49*	1.73*	1.85*	2.08*	2.75*	3.38*	
		20	0.90	1.05	1.35	1.49*	1.65*	1.81*	2.11*	2.25*	2.54*	3.38*	4.20*	
		30	1.02	1.19	1.52	1.68*	1.87*	2.05*	2.39*	2.56*	2.90*	3.88*	4.86*	
		40	1.11	1.30	1.67	1.85*	2.05*	2.25*	2.64*	2.83*	3.20*	4.32*	5.44*	
		60	1.27	1.48	1.91	2.12*	2.35*	2.59*	3.05*	3.28*	3.73*	5.10*	6.50*	
		70	1.33	1.56	2.01	2.24*	2.49*	2.74*	3.23*	3.48*	3.97*	5.45*	6.99*	
		80	1.40	1.63	2.11	2.35*	2.62*	2.88*	3.41*	3.67*	4.19*	5.80*	7.46*	
250	°C	5	0.66	0.77	0.98	1.09*	1.20*	1.31*	1.53*	1.63*	1.83*	2.40*	2.94*	
		10	0.79	0.92	1.17	1.30*	1.43*	1.57*	1.82*	1.95*	2.19*	2.88*	3.53*	
		20	0.96	1.12	1.43	1.58*	1.74*	1.91*	2.22*	2.37*	2.68*	3.55*	4.38*	
		30	1.09	1.26	1.61	1.78*	1.97*	2.16*	2.52*	2.70*	3.05*	4.07*	5.06*	
		40	1.19	1.38	1.77	1.96*	2.17*	2.37*	2.78*	2.98*	3.37*	4.52*	5.66*	
		60	1.36	1.58	2.02	2.24*	2.49*	2.73*	3.21*	3.45*	3.91*	5.31*	6.73*	
		70	1.43	1.66	2.13	2.37*	2.63*	2.89*	3.40*	3.65*	4.16*	5.67*	7.22*	
		80	1.49	1.74	2.24	2.48*	2.76*	3.04*	3.58*	3.85*	4.39*	6.02*	7.69*	
300	°C	5	0.69	0.80	1.03	1.13*	1.25*	1.37*	1.59*	1.70*	1.90*	2.50*	3.05*	
		10	0.83	0.96	1.23	1.36*	1.50*	1.63*	1.90*	2.03*	2.28*	3.00*	3.67*	
		20	1.01	1.18	1.50	1.65*	1.82*	1.99*	2.32*	2.48*	2.79*	3.69*	4.55*	
		30	1.15	1.33	1.69	1.87*	2.07*	2.26*	2.64*	2.82*	3.18*	4.23*	5.25*	
		40	1.25	1.46	1.86	2.05*	2.27*	2.49*	2.91*	3.11*	3.52*	4.70*	5.86*	
		60	1.43	1.67	2.13	2.35*	2.61*	2.86*	3.36*	3.60*	4.08*	5.51*	6.94*	
		70	1.51	1.76	2.24	2.48*	2.76*	3.03*	3.55*	3.81*	4.33*	5.87*	7.44*	
		80	1.58	1.84	2.35	2.61*	2.90*	3.18*	3.74*	4.02*	4.57*	6.22*	7.91*	
400	°C	5	0.74	0.86	1.10	1.21*	1.34*	1.46*	1.70*	1.81*	2.03*	2.65*	3.24*	
		10	0.90	1.04	1.32	1.46*	1.61*	1.75*	2.04*	2.17*	2.44*	3.20*	3.91*	
		20	1.10	1.28	1.62	1.78*	1.97*	2.15*	2.50*	2.67*	3.00*	3.95*	4.85*	
		30	1.25	1.45	1.83	2.02*	2.23*	2.44*	2.84*	3.04*	3.42*	4.52*	5.59*	
		40	1.37	1.59	2.01	2.22*	2.45*	2.68*	3.13*	3.35*	3.77*	5.01*	6.22*	
		60	1.56	1.82	2.30	2.55*	2.82*	3.09*	3.61*	3.87*	4.37*	5.86*	7.33*	
		70	1.65	1.91	2.43	2.69*	2.98*	3.26*	3.82*	4.09*	4.64*	6.24*	7.84*	
		80	1.72	2.00	2.55	2.82*	3.13*	3.43*	4.02*	4.31*	4.88*	6.60*	8.32*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 m (RADIUS = 1.4 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE
TIME INDEX

CEILING HEIGHT, m

(m*s)^{1/2}

TEMPERATURE
RISE

°C

1

2

4

5

6

7

9

10

12

18

24

0

5

10

20

30

40

60

70

80

0.36

0.42

0.50

0.58

0.65

0.77

0.83

0.89

0.91

1.11

1.20

1.29

0.47

0.55

0.68

0.80

0.91

1.11

1.20

1.29

0.69

0.83

1.06

1.27

1.45

1.79

1.95

2.11

0.80*

0.97*

1.26*

1.50*

1.73*

2.15*

2.34*

2.53*

0.91*

1.11*

1.45*

1.75*

2.02*

2.51*

2.75*

2.97*

1.02*

1.26*

1.65*

1.99*

2.31*

2.89*

3.16*

3.42*

1.25*

1.55*

2.05*

2.50*

2.90*

3.65*

4.00*

4.34*

1.36*

1.69*

2.26*

2.75*

3.21*

4.04*

4.43*

4.81*

1.58*

1.99*

2.67*

3.28*

3.83*

4.85*

5.32*

5.78*

2.25*

2.89*

3.97*

4.91*

5.78*

7.38*

8.12*

8.84*

2.92*

3.82*

5.32*

6.64*

7.84*

10.06*

11.10*

12.10*

10

5

10

20

30

40

60

70

80

0.50

0.58

0.68

0.76

0.83

0.95

1.01

1.07

0.61

0.70

0.84

0.95

1.05

1.24

1.33

1.41

0.82

0.96

1.18

1.37

1.55

1.88

2.04

2.19

0.93*

1.09*

1.36*

1.60*

1.82*

2.23*

2.42*

2.61*

1.04*

1.23*

1.55*

1.84*

2.10*

2.59*

2.82*

3.04*

1.15*

1.37*

1.75*

2.08*

2.39*

2.96*

3.23*

3.49*

1.37*

1.66*

2.15*

2.58*

2.98*

3.72*

4.07*

4.40*

1.48*

1.80*

2.35*

2.84*

3.29*

4.11*

4.50*

4.88*

1.70*

2.09*

2.76*

3.36*

3.91*

4.91*

5.38*

5.84*

2.36*

2.98*

4.05*

4.99*

5.85*

7.44*

8.18*

8.89*

3.02*

3.90*

5.39*

6.70*

7.91*

10.12*

11.15*

12.15*

20

5

10

20

30

40

60

70

80

0.56

0.65

0.77

0.86

0.94

1.16

1.35

1.44

1.53

0.67

0.78

0.93

1.06

1.16

1.35

1.44

1.53

0.90

1.05

1.28

1.47

1.65

1.93

2.19

2.67

2.90

3.12

1.01*

1.18*

1.46*

1.69*

1.91*

2.31*

2.50*

2.69*

1.12*

1.33*

1.65*

1.93*

2.19*

2.67*

2.90*

3.12*

1.24*

1.47*

1.84*

2.17*

2.47*

3.04*

3.30*

3.56*

1.46*

1.75*

2.24*

2.66*

3.06*

3.79*

4.14*

4.47*

1.57*

1.90*

2.44*

2.92*

3.36*

4.18*

4.57*

4.94*

1.80*

2.19*

2.85*

3.43*

3.98*

4.98*

5.45*

5.90*

2.46*

3.07*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 m (RADIUS = 1.4 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE		CEILING HEIGHT, m											
(m*s) ^{1/2}		°C	1	2	4	5	6	7	9	10	12	18	24		
150	5	0.85	1.00	1.29	1.43*	1.58*	1.73*	2.01*	2.15*	2.43*	3.22*	3.97*			
	10	1.02	1.20	1.54	1.71*	1.89*	2.08*	2.43*	2.60*	2.94*	3.93*	4.89*			
	20	1.25	1.46	1.89	2.10*	2.33*	2.56*	3.02*	3.24*	3.68*	5.00*	6.34*			
	30	1.42	1.66	2.16	2.40*	2.68*	2.95*	3.48*	3.75*	4.28*	5.91*	7.59*			
	40	1.55	1.83	2.38	2.66*	2.97*	3.28*	3.89*	4.20*	4.82*	6.74*	8.75*			
	60	1.78	2.10	2.76	3.10*	3.48*	3.85*	4.62*	5.00*	5.79*	8.26*	10.89*			
	70	1.88	2.22	2.93	3.30*	3.71*	4.12*	4.95*	5.37*	6.24*	8.97*	11.89*			
	80	1.97	2.33	3.09	3.49*	3.93*	4.37*	5.27*	5.73*	6.67*	9.66*	12.87*			
200	5	0.91	1.07	1.37	1.52*	1.68*	1.84*	2.14*	2.29*	2.57*	3.40*	4.18*			
	10	1.10	1.29	1.65	1.83*	2.02*	2.21*	2.59*	2.77*	3.12*	4.15*	5.15*			
	20	1.35	1.58	2.03	2.25*	2.50*	2.74*	3.21*	3.45*	3.91*	5.27*	6.63*			
	30	1.54	1.80	2.32	2.57*	2.86*	3.14*	3.70*	3.98*	4.53*	6.19*	7.89*			
	40	1.69	1.98	2.56	2.85*	3.17*	3.49*	4.13*	4.45*	5.08*	7.02*	9.04*			
	60	1.93	2.27	2.96	3.31*	3.70*	4.09*	4.87*	5.27*	6.06*	8.53*	11.15*			
	70	2.04	2.40	3.14	3.52*	3.94*	4.36*	5.21*	5.64*	6.51*	9.24*	12.15*			
	80	2.14	2.52	3.31	3.71*	4.17*	4.62*	5.53*	6.00*	6.95*	9.93*	13.12*			
250	5	0.97	1.13	1.44	1.60*	1.77*	1.93*	2.24*	2.40*	2.70*	3.55*	4.36*			
	10	1.17	1.36	1.74	1.93*	2.13*	2.33*	2.72*	2.91*	3.28*	4.35*	5.37*			
	20	1.44	1.68	2.15	2.38*	2.64*	2.89*	3.38*	3.63*	4.10*	5.50*	6.89*			
	30	1.64	1.91	2.45	2.72*	3.02*	3.32*	3.90*	4.18*	4.75*	6.44*	8.16*			
	40	1.80	2.11	2.71	3.01*	3.35*	3.68*	4.34*	4.66*	5.31*	7.28*	9.31*			
	60	2.07	2.42	3.14	3.50*	3.90*	4.30*	5.10*	5.50*	6.31*	8.80*	11.42*			
	70	2.18	2.56	3.32	3.71*	4.15*	4.58*	5.45*	5.88*	6.77*	9.51*	12.41*			
	80	2.29	2.69	3.50	3.91*	4.38*	4.84*	5.78*	6.25*	7.20*	10.19*	13.37*			
300	5	1.01	1.18	1.51	1.67*	1.84*	2.01*	2.34*	2.50*	2.81*	3.69*	4.53*			
	10	1.23	1.43	1.83	2.02*	2.23*	2.44*	2.84*	3.04*	3.42*	4.52*	5.58*			
	20	1.52	1.77	2.26	2.50*	2.76*	3.03*	3.54*	3.79*	4.28*	5.72*	7.13*			
	30	1.73	2.02	2.58	2.85*	3.17*	3.47*	4.07*	4.36*	4.95*	6.68*	8.41*			
	40	1.90	2.22	2.84	3.15*	3.50*	3.85*	4.53*	4.86*	5.53*	7.53*	9.57*			
	60	2.18	2.55	3.29	3.66*	4.08*	4.49*	5.31*	5.72*	6.54*	9.05*	11.67*			
	70	2.30	2.70	3.49	3.88*	4.33*	4.78*	5.66*	6.11*	7.00*	9.76*	12.66*			
	80	2.42	2.83	3.67	4.09*	4.57*	5.05*	6.00*	6.48*	7.44*	10.44*	13.62*			
400	5	1.09	1.27	1.62	1.79*	1.97*	2.15*	2.50*	2.67*	3.00*	3.93*	4.81*			
	10	1.34	1.55	1.97	2.17*	2.40*	2.62*	3.05*	3.26*	3.66*	4.82*	5.93*			
	20	1.66	1.92	2.44	2.69*	2.98*	3.26*	3.80*	4.06*	4.58*	6.09*	7.56*			
	30	1.89	2.19	2.79	3.08*	3.41*	3.74*	4.37*	4.68*	5.29*	7.09*	8.88*			
	40	2.08	2.42	3.08	3.41*	3.78*	4.14*	4.86*	5.21*	5.90*	7.97*	10.05*			
	60	2.39	2.78	3.56	3.95*	4.39*	4.82*	5.68*	6.11*	6.96*	9.52*	12.16*			
	70	2.52	2.94	3.77	4.19*	4.66*	5.12*	6.05*	6.51*	7.43*	10.23*	13.15*			
	80	2.64	3.08	3.96	4.41*	4.91*	5.41*	6.40*	6.89*	7.88*	10.92*	14.10*			

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 m (RADIUS = 1.4 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0	°C												
	5	0.53	0.70	1.05	1.23*	1.41*	1.58*	1.94*	2.12*	2.49*	3.60*	4.75*	
	10	0.63	0.86	1.33	1.57*	1.81*	2.05*	2.55*	2.80*	3.31*	4.89*	6.53*	
	20	0.81	1.13	1.79	2.13*	2.48*	2.83*	3.56*	3.93*	4.68*	7.05*	9.54*	
	30	0.96	1.36	2.20	2.63*	3.07*	3.52*	4.45*	4.92*	5.89*	8.94*	12.17*	
	40	1.10	1.58	2.57	3.08*	3.61*	4.15*	5.26*	5.83*	7.00*	10.68*	14.59*	
	60	1.35	1.97	3.25	3.92*	4.61*	5.31*	6.76*	7.50*	9.03*	13.87*	19.02*	
	70	1.47	2.15	3.57	4.31*	5.07*	5.85*	7.46*	8.28*	9.98*	15.35*	21.10*	
10	80	1.59	2.33	3.88	4.69*	5.52*	6.37*	8.13*	9.03*	10.89*	16.79*	23.09*	
	5	0.72	0.88	1.20	1.37*	1.55*	1.72*	2.07*	2.25*	2.61*	3.71*	4.85*	
	10	0.84	1.04	1.47	1.69*	1.93*	2.17*	2.66*	2.91*	3.41*	4.98*	6.62*	
	20	1.02	1.30	1.91	2.24*	2.58*	2.93*	3.65*	4.02*	4.77*	7.13*	9.61*	
	30	1.17	1.52	2.31	2.73*	3.16*	3.61*	4.53*	5.00*	5.97*	9.01*	12.24*	
	40	1.31	1.73	2.67	3.18*	3.70*	4.24*	5.34*	5.91*	7.07*	10.75*	14.66*	
	60	1.55	2.11	3.34	4.00*	4.69*	5.38*	6.83*	7.57*	9.10*	13.93*	19.08*	
	70	1.66	2.28	3.66	4.39*	5.15*	5.92*	7.52*	8.35*	10.04*	15.41*	21.15*	
20	80	1.77	2.46	3.96	4.76*	5.59*	6.44*	8.20*	9.10*	10.95*	16.85*	23.15*	
	5	0.81	0.97	1.31	1.48*	1.66*	1.84*	2.19*	2.37*	2.73*	3.82*	4.95*	
	10	0.95	1.16	1.58	1.80*	2.04*	2.28*	2.76*	3.01*	3.51*	5.07*	6.71*	
	20	1.16	1.43	2.02	2.34*	2.68*	3.03*	3.75*	4.11*	4.86*	7.21*	9.69*	
	30	1.32	1.66	2.41	2.82*	3.26*	3.70*	4.62*	5.09*	6.05*	9.08*	12.31*	
	40	1.46	1.86	2.77	3.27*	3.79*	4.32*	5.42*	5.99*	7.15*	10.81*	14.72*	
	60	1.71	2.24	3.44	4.08*	4.76*	5.46*	6.90*	7.64*	9.16*	13.99*	19.14*	
	70	1.83	2.41	3.75	4.47*	5.22*	5.99*	7.59*	8.42*	10.10*	15.47*	21.20*	
50	80	1.94	2.58	4.05	4.84*	5.66*	6.51*	8.26*	9.16*	11.02*	16.90*	23.20*	
	5	0.97	1.15	1.52	1.70*	1.89*	2.08*	2.46*	2.64*	3.01*	4.12*	5.25*	
	10	1.16	1.38	1.83	2.06*	2.31*	2.56*	3.05*	3.30*	3.80*	5.35*	6.96*	
	20	1.42	1.70	2.31	2.62*	2.96*	3.31*	4.01*	4.37*	5.11*	7.44*	9.90*	
	30	1.61	1.96	2.70	3.09*	3.52*	3.96*	4.86*	5.33*	6.28*	9.30*	12.50*	
	40	1.78	2.18	3.05	3.53*	4.04*	4.56*	5.65*	6.21*	7.36*	11.01*	14.90*	
	60	2.07	2.57	3.70	4.33*	5.00*	5.68*	7.11*	7.85*	9.36*	14.17*	19.30*	
	70	2.19	2.74	4.01	4.70*	5.45*	6.21*	7.80*	8.61*	10.30*	15.64*	21.36*	
100	80	2.31	2.91	4.30	5.07*	5.88*	6.72*	8.46*	9.36*	11.20*	17.07*	23.35*	
	5	1.13	1.34	1.74	1.93*	2.15*	2.36*	2.76*	2.96*	3.36*	4.52*	5.68*	
	10	1.37	1.62	2.11	2.35*	2.62*	2.89*	3.41*	3.67*	4.19*	5.76*	7.38*	
	20	1.69	2.00	2.64	2.97*	3.32*	3.68*	4.41*	4.77*	5.51*	7.82*	10.26*	
	30	1.93	2.30	3.06	3.46*	3.90*	4.35*	5.25*	5.71*	6.66*	9.65*	12.83*	
	40	2.12	2.55	3.44	3.90*	4.42*	4.95*	6.03*	6.58*	7.72*	11.34*	15.21*	
	60	2.46	2.97	4.09	4.70*	5.36*	6.05*	7.46*	8.19*	9.68*	14.46*	19.58*	
	70	2.60	3.17	4.40	5.07*	5.81*	6.56*	8.13*	8.94*	10.61*	15.93*	21.63*	
	80	2.74	3.35	4.69	5.43*	6.23*	7.06*	8.78*	9.67*	11.50*	17.35*	23.61*	

TIME TO ACTUATE HEAT DETECTOR, MINUTE

SPACING = 2.0 m (RADIUS = 1.4 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	1.25	1.47	1.90	2.11*	2.33*	2.56*	2.99*	3.20*	3.62*	4.84*	6.03*
	10	1.52	1.79	2.31	2.57*	2.86*	3.14*	3.69*	3.96*	4.51*	6.12*	7.75*
	20	1.89	2.22	2.89	3.23*	3.61*	3.99*	4.73*	5.11*	5.86*	8.18*	10.62*
	30	2.15	2.55	3.35	3.76*	4.22*	4.67*	5.59*	6.06*	7.01*	9.99*	13.16*
	40	2.38	2.82	3.74	4.22*	4.75*	5.28*	6.37*	6.93*	8.06*	11.66*	15.51*
	60	2.74	3.28	4.43	5.03*	5.70*	6.38*	7.79*	8.52*	10.01*	14.76*	19.86*
	70	2.90	3.49	4.74	5.40*	6.14*	6.90*	8.46*	9.26*	10.92*	16.21*	21.90*
	80	3.05	3.68	5.03	5.76*	6.57*	7.39*	9.10*	9.99*	11.81*	17.62*	23.87*
200	5	1.35	1.58	2.03	2.25*	2.49*	2.72*	3.18*	3.40*	3.84*	5.11*	6.33*
	10	1.65	1.93	2.48	2.75*	3.05*	3.35*	3.93*	4.21*	4.77*	6.44*	8.10*
	20	2.04	2.40	3.10	3.46*	3.85*	4.24*	5.01*	5.40*	6.17*	8.52*	10.96*
	30	2.34	2.75	3.59	4.01*	4.48*	4.95*	5.90*	6.37*	7.33*	10.32*	13.48*
	40	2.58	3.05	4.00	4.49*	5.03*	5.58*	6.69*	7.25*	8.39*	11.98*	15.81*
	60	2.98	3.54	4.71	5.32*	6.01*	6.70*	8.11*	8.83*	10.32*	15.05*	20.13*
	70	3.15	3.76	5.03	5.70*	6.45*	7.21*	8.77*	9.58*	11.23*	16.50*	22.16*
	80	3.31	3.96	5.34	6.07*	6.88*	7.71*	9.41*	10.29*	12.10*	17.90*	24.13*
250	5	1.43	1.67	2.14	2.37*	2.62*	2.86*	3.34*	3.57*	4.03*	5.34*	6.60*
	10	1.75	2.05	2.62	2.90*	3.22*	3.53*	4.13*	4.42*	5.01*	6.71*	8.41*
	20	2.18	2.55	3.29	3.65*	4.06*	4.47*	5.26*	5.66*	6.45*	8.83*	11.28*
	30	2.50	2.93	3.79	4.23*	4.72*	5.20*	6.17*	6.66*	7.63*	10.63*	13.79*
	40	2.76	3.24	4.22	4.73*	5.29*	5.85*	6.97*	7.54*	8.69*	12.29*	16.11*
	60	3.18	3.77	4.96	5.58*	6.28*	6.98*	8.41*	9.13*	10.62*	15.34*	20.40*
	70	3.37	3.99	5.29	5.97*	6.73*	7.50*	9.07*	9.87*	11.52*	16.78*	22.43*
	80	3.54	4.21	5.60	6.34*	7.16*	8.00*	9.71*	10.59*	12.40*	18.17*	24.38*
300	5	1.50	1.75	2.24	2.47*	2.73*	2.99*	3.48*	3.72*	4.19*	5.54*	6.84*
	10	1.85	2.15	2.75	3.04*	3.37*	3.69*	4.31*	4.61*	5.21*	6.97*	8.69*
	20	2.30	2.69	3.45	3.82*	4.25*	4.67*	5.49*	5.89*	6.70*	9.12*	11.59*
	30	2.64	3.08	3.98	4.43*	4.93*	5.43*	6.42*	6.91*	7.91*	10.93*	14.09*
	40	2.91	3.41	4.43	4.94*	5.52*	6.09*	7.24*	7.81*	8.98*	12.59*	16.40*
	60	3.36	3.96	5.19	5.82*	6.53*	7.24*	8.69*	9.42*	10.91*	15.62*	20.68*
	70	3.56	4.20	5.53	6.22*	6.99*	7.77*	9.35*	10.16*	11.81*	17.05*	22.69*
	80	3.74	4.42	5.85	6.59*	7.43*	8.27*	9.99*	10.88*	12.68*	18.44*	24.64*
400	5	1.63	1.89	2.41	2.66*	2.94*	3.21*	3.73*	3.99*	4.48*	5.91*	7.26*
	10	2.01	2.33	2.97	3.28*	3.62*	3.96*	4.62*	4.95*	5.58*	7.41*	9.20*
	20	2.51	2.92	3.73	4.12*	4.57*	5.01*	5.88*	6.30*	7.15*	9.65*	12.17*
	30	2.88	3.35	4.30	4.77*	5.30*	5.83*	6.86*	7.37*	8.40*	11.49*	14.68*
	40	3.18	3.71	4.78	5.31*	5.92*	6.52*	7.71*	8.31*	9.50*	13.15*	16.98*
	60	3.67	4.31	5.59	6.24*	6.98*	7.72*	9.20*	9.94*	11.45*	16.18*	21.21*
	70	3.88	4.57	5.95	6.66*	7.46*	8.26*	9.88*	10.69*	12.36*	17.60*	23.21*
	80	4.08	4.80	6.28	7.05*	7.91*	8.77*	10.52*	11.41*	13.23*	18.97*	25.14*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 m (RADIUS = 1.4 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	°C												
	5	0.80	1.08	1.66	1.96*	2.25*	2.56*	3.17*	3.48*	4.10*	6.04*	8.05*	
	10	1.01	1.40	2.21	2.63*	3.06*	3.49*	4.37*	4.82*	5.74*	8.61*	11.62*	
	20	1.36	1.94	3.14	3.76*	4.40*	5.06*	6.40*	7.09*	8.49*	12.93*	17.63*	
	30	1.66	2.40	3.95	4.76*	5.58*	6.43*	8.17*	9.07*	10.90*	16.71*	22.90*	
	40	1.94	2.83	4.70	5.67*	6.67*	7.69*	9.81*	10.89*	13.12*	20.19*	27.74*	
	60	2.45	3.62	6.06	7.34*	8.66*	10.00*	12.79*	14.23*	17.18*	26.56*	36.60*	
	70	2.68	3.99	6.70	8.12*	9.58*	11.08*	14.19*	15.79*	19.08*	29.54*	40.74*	
80	2.91	4.34	7.32	8.88*	10.48*	12.13*	15.54*	17.30*	20.91*	32.41*	44.74*		
10	5	1.05	1.30	1.83	2.11*	2.40*	2.69*	3.30*	3.60*	4.22*	6.15*	8.15*	
	10	1.27	1.60	2.36	2.76*	3.18*	3.61*	4.48*	4.93*	5.84*	8.70*	11.71*	
	20	1.60	2.11	3.26	3.87*	4.51*	5.16*	6.49*	7.18*	8.58*	13.01*	17.71*	
	30	1.89	2.56	4.06	4.86*	5.68*	6.52*	8.26*	9.15*	10.98*	16.78*	22.97*	
	40	2.16	2.98	4.80	5.76*	6.76*	7.78*	9.88*	10.97*	13.19*	20.26*	27.80*	
	60	2.65	3.76	6.15	7.42*	8.73*	10.08*	12.86*	14.30*	17.25*	26.62*	36.66*	
	70	2.88	4.12	6.79	8.20*	9.66*	11.16*	14.26*	15.86*	19.14*	29.60*	40.80*	
	80	3.10	4.47	7.40	8.95*	10.55*	12.20*	15.60*	17.36*	20.97*	32.47*	44.79*	
20	5	1.19	1.44	1.97	2.24*	2.53*	2.83*	3.43*	3.73*	4.35*	6.26*	8.25*	
	10	1.43	1.76	2.49	2.88*	3.30*	3.72*	4.59*	5.04*	5.94*	8.79*	11.80*	
	20	1.79	2.27	3.38	3.98*	4.61*	5.25*	6.58*	7.27*	8.67*	13.08*	17.78*	
	30	2.09	2.72	4.17	4.95*	5.77*	6.61*	8.34*	9.23*	11.06*	16.86*	23.03*	
	40	2.35	3.13	4.90	5.85*	6.84*	7.86*	9.96*	11.05*	13.27*	20.32*	27.86*	
	60	2.84	3.89	6.25	7.51*	8.81*	10.16*	12.94*	14.37*	17.31*	26.68*	36.71*	
	70	3.06	4.25	6.88	8.28*	9.74*	11.23*	14.33*	15.92*	19.21*	29.65*	40.85*	
	80	3.28	4.60	7.49	9.03*	10.63*	12.27*	15.67*	17.42*	21.03*	32.52*	44.85*	
50	5	1.43	1.70	2.26	2.55*	2.85*	3.16*	3.76*	4.07*	4.69*	6.58*	8.56*	
	10	1.74	2.09	2.83	3.21*	3.63*	4.05*	4.91*	5.35*	6.25*	9.07*	12.06*	
	20	2.17	2.65	3.71	4.29*	4.91*	5.55*	6.86*	7.54*	8.92*	13.32*	18.00*	
	30	2.51	3.11	4.49	5.24*	6.05*	6.88*	8.59*	9.48*	11.30*	17.07*	23.23*	
	40	2.80	3.53	5.20	6.12*	7.10*	8.11*	10.20*	11.27*	13.49*	20.52*	28.05*	
	60	3.31	4.28	6.52	7.75*	9.05*	10.38*	13.15*	14.58*	17.51*	26.86*	36.88*	
	70	3.54	4.62	7.14	8.52*	9.96*	11.45*	14.53*	16.12*	19.40*	29.83*	41.01*	
	80	3.76	4.96	7.74	9.26*	10.85*	12.48*	15.87*	17.62*	21.22*	32.69*	45.00*	
100	5	1.68	1.98	2.59	2.89*	3.22*	3.55*	4.19*	4.51*	5.15*	7.08*	9.05*	
	10	2.06	2.44	3.22	3.62*	4.06*	4.50*	5.38*	5.82*	6.72*	9.52*	12.48*	
	20	2.58	3.09	4.17	4.74*	5.36*	6.00*	7.31*	7.97*	9.35*	13.71*	18.36*	
	30	2.97	3.60	4.95	5.69*	6.49*	7.31*	9.01*	9.88*	11.68*	17.42*	23.56*	
	40	3.30	4.04	5.66	6.55*	7.52*	8.52*	10.58*	11.65*	13.85*	20.85*	28.36*	
	60	3.87	4.82	6.96	8.15*	9.43*	10.75*	13.50*	14.92*	17.84*	27.16*	37.16*	
	70	4.12	5.17	7.57	8.90*	10.33*	11.81*	14.87*	16.45*	19.71*	30.11*	41.28*	
	80	4.36	5.51	8.16	9.63*	11.21*	12.83*	16.20*	17.94*	21.52*	32.97*	45.26*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 m (RADIUS = 1.4 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 150	°C												
	5	1.86	2.19	2.83	3.15*	3.50*	3.85*	4.53*	4.86*	5.53*	7.50*	9.50*	
	10	2.29	2.70	3.53	3.94*	4.40*	4.86*	5.77*	6.22*	7.14*	9.95*	12.90*	
	20	2.87	3.42	4.53	5.11*	5.75*	6.40*	7.72*	8.39*	9.76*	14.09*	18.72*	
	30	3.31	3.97	5.35	6.08*	6.89*	7.71*	9.40*	10.28*	12.07*	17.77*	23.89*	
	40	3.68	4.44	6.07	6.95*	7.92*	8.91*	10.96*	12.02*	14.21*	21.18*	28.66*	
	60	4.30	5.26	7.37	8.54*	9.81*	11.12*	13.85*	15.26*	18.17*	27.46*	37.44*	
	70	4.57	5.62	7.98	9.28*	10.70*	12.16*	15.21*	16.78*	20.03*	30.40*	41.55*	
200	80	4.83	5.97	8.56	10.00*	11.56*	13.17*	16.52*	18.26*	21.83*	33.25*	45.52*	
	5	2.01	2.35	3.03	3.37*	3.74*	4.10*	4.81*	5.15*	5.84*	7.88*	9.90*	
	10	2.48	2.91	3.78	4.21*	4.69*	5.16*	6.10*	6.57*	7.51*	10.35*	13.31*	
	20	3.12	3.68	4.84	5.43*	6.09*	6.75*	8.09*	8.77*	10.14*	14.47*	19.08*	
	30	3.59	4.27	5.69	6.43*	7.25*	8.08*	9.78*	10.65*	12.44*	18.12*	24.22*	
	40	3.99	4.77	6.43	7.31*	8.29*	9.28*	11.33*	12.39*	14.56*	21.51*	28.97*	
	60	4.65	5.63	7.75	8.90*	10.17*	11.48*	14.19*	15.60*	18.49*	27.75*	37.71*	
	70	4.94	6.01	8.36	9.64*	11.06*	12.51*	15.54*	17.11*	20.34*	30.69*	41.82*	
250	80	5.21	6.37	8.94	10.36*	11.91*	13.51*	16.85*	18.57*	22.13*	33.52*	45.78*	
	5	2.13	2.49	3.20	3.55*	3.93*	4.31*	5.05*	5.41*	6.12*	8.21*	10.27*	
	10	2.64	3.10	3.99	4.44*	4.94*	5.43*	6.40*	6.88*	7.84*	10.73*	13.69*	
	20	3.33	3.92	5.11	5.72*	6.39*	7.07*	8.43*	9.12*	10.50*	14.84*	19.43*	
	30	3.83	4.54	5.99	6.74*	7.58*	8.42*	10.14*	11.01*	12.80*	18.46*	24.54*	
	40	4.26	5.06	6.75	7.64*	8.63*	9.63*	11.69*	12.74*	14.91*	21.83*	29.27*	
	60	4.96	5.96	8.09	9.24*	10.52*	11.82*	14.53*	15.93*	18.81*	28.05*	37.99*	
	70	5.26	6.35	8.71	9.99*	11.40*	12.85*	15.87*	17.43*	20.65*	30.97*	42.08*	
300	80	5.55	6.73	9.30	10.70*	12.25*	13.85*	17.17*	18.89*	22.44*	33.80*	46.04*	
	5	2.25	2.62	3.35	3.71*	4.11*	4.50*	5.26*	5.64*	6.37*	8.51*	10.61*	
	10	2.79	3.26	4.18	4.64*	5.16*	5.67*	6.66*	7.16*	8.14*	11.07*	14.06*	
	20	3.51	4.12	5.35	5.97*	6.67*	7.36*	8.75*	9.44*	10.84*	15.19*	19.78*	
	30	4.05	4.77	6.26	7.02*	7.87*	8.73*	10.47*	11.35*	13.14*	18.80*	24.86*	
	40	4.49	5.32	7.04	7.94*	8.94*	9.95*	12.02*	13.08*	15.25*	22.15*	29.57*	
	60	5.23	6.25	8.41	9.56*	10.85*	12.16*	14.86*	16.26*	19.13*	28.34*	38.27*	
	70	5.55	6.66	9.03	10.31*	11.73*	13.18*	16.19*	17.75*	20.96*	31.26*	42.35*	
400	80	5.85	7.04	9.63	11.03*	12.58*	14.17*	17.49*	19.20*	22.74*	34.07*	46.29*	
	5	2.44	2.83	3.61	3.99*	4.42*	4.83*	5.64*	6.03*	6.80*	9.04*	11.22*	
	10	3.03	3.53	4.51	5.00*	5.55*	6.08*	7.13*	7.65*	8.67*	11.70*	14.74*	
	20	3.83	4.48	5.77	6.42*	7.15*	7.87*	9.31*	10.02*	11.46*	15.87*	20.46*	
	30	4.42	5.18	6.73	7.52*	8.41*	9.30*	11.08*	11.97*	13.79*	19.46*	25.50*	
	40	4.90	5.77	7.56	8.48*	9.51*	10.55*	12.65*	13.72*	15.90*	22.79*	30.18*	
	60	5.70	6.77	8.98	10.15*	11.45*	12.78*	15.50*	16.89*	19.76*	28.93*	38.82*	
	70	6.05	7.20	9.62	10.91*	12.34*	13.81*	16.82*	18.38*	21.57*	31.82*	42.88*	
80	6.37	7.61	10.23	11.63*	13.20*	14.80*	18.10*	19.81*	23.33*	34.62*	46.81*		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.5 m (RADIUS = 1.8 m)
FIRE GROWTH: ULTRAFAST ($\alpha = .1875 \text{ kJ/s}^3$)

RESPONSE TIME INDEX
TEMPERATURE RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C											
		1	2	4	5	6	7	9	10	12	18	24
0	5	0.30	0.36	0.51	0.58	0.65*	0.72*	0.86*	0.93*	1.07*	1.49*	1.91*
	10	0.33	0.41	0.58	0.67	0.76*	0.84*	1.02*	1.11*	1.29*	1.82*	2.36*
	20	0.38	0.48	0.71	0.82	0.94*	1.05*	1.29*	1.40*	1.64*	2.38*	3.13*
	30	0.42	0.55	0.82	0.96	1.10*	1.24*	1.52*	1.66*	1.96*	2.86*	3.81*
	40	0.46	0.61	0.92	1.08	1.24*	1.40*	1.73*	1.90*	2.25*	3.31*	4.42*
	60	0.54	0.72	1.11	1.31	1.51*	1.71*	2.13*	2.34*	2.77*	4.13*	5.56*
	70	0.57	0.78	1.19	1.41	1.63*	1.85*	2.31*	2.54*	3.02*	4.51*	6.09*
	80	0.61	0.83	1.28	1.51	1.75*	1.99*	2.49*	2.74*	3.26*	4.88*	6.60*
10	5	0.41	0.47	0.62	0.69	0.76*	0.83*	0.97*	1.04*	1.18*	1.60*	2.01*
	10	0.46	0.53	0.70	0.78	0.86*	0.95*	1.12*	1.21*	1.39*	1.91*	2.45*
	20	0.53	0.62	0.82	0.93	1.04*	1.15*	1.38*	1.49*	1.73*	2.45*	3.21*
	30	0.58	0.69	0.93	1.06	1.19*	1.32*	1.60*	1.75*	2.04*	2.93*	3.87*
	40	0.63	0.75	1.03	1.17	1.33*	1.49*	1.81*	1.98*	2.32*	3.38*	4.49*
	60	0.70	0.86	1.21	1.39	1.58*	1.79*	2.20*	2.41*	2.84*	4.19*	5.61*
	70	0.74	0.91	1.29	1.49	1.71*	1.93*	2.38*	2.61*	3.08*	4.57*	6.14*
	80	0.77	0.96	1.37	1.59	1.82*	2.06*	2.55*	2.81*	3.32*	4.94*	6.65*
20	5	0.45	0.52	0.67	0.74	0.82*	0.89*	1.04*	1.12*	1.26*	1.68*	2.10*
	10	0.51	0.59	0.77	0.85	0.94*	1.03*	1.21*	1.29*	1.47*	2.00*	2.53*
	20	0.60	0.70	0.91	1.01	1.12*	1.23*	1.46*	1.58*	1.81*	2.53*	3.28*
	30	0.66	0.77	1.02	1.14	1.27*	1.41*	1.68*	1.83*	2.11*	3.00*	3.94*
	40	0.71	0.84	1.12	1.26	1.41*	1.57*	1.89*	2.05*	2.39*	3.44*	4.55*
	60	0.80	0.96	1.29	1.47	1.66*	1.86*	2.27*	2.48*	2.91*	4.25*	5.67*
	70	0.84	1.01	1.38	1.57	1.78*	2.00*	2.45*	2.68*	3.15*	4.63*	6.19*
	80	0.88	1.06	1.46	1.67	1.89*	2.13*	2.62*	2.87*	3.38*	4.99*	6.70*
50	5	0.53	0.61	0.77	0.85	0.93*	1.01*	1.18*	1.26*	1.42*	1.87*	2.31*
	10	0.61	0.70	0.89	0.99	1.08*	1.18*	1.37*	1.47*	1.66*	2.21*	2.76*
	20	0.72	0.83	1.06	1.18	1.29*	1.41*	1.66*	1.78*	2.02*	2.75*	3.49*
	30	0.81	0.93	1.19	1.33	1.46*	1.60*	1.89*	2.03*	2.32*	3.21*	4.13*
	40	0.88	1.02	1.31	1.45	1.60*	1.76*	2.09*	2.26*	2.59*	3.64*	4.73*
	60	0.99	1.15	1.50	1.68	1.86*	2.06*	2.47*	2.67*	3.10*	4.43*	5.83*
	70	1.04	1.22	1.59	1.78	1.98*	2.20*	2.64*	2.87*	3.33*	4.80*	6.35*
	80	1.09	1.27	1.67	1.88	2.09*	2.33*	2.81*	3.06*	3.56*	5.16*	6.86*
100	5	0.61	0.69	0.87	0.96	1.05*	1.14*	1.32*	1.41*	1.58*	2.07*	2.54*
	10	0.71	0.82	1.03	1.13	1.23*	1.34*	1.55*	1.66*	1.86*	2.46*	3.04*
	20	0.86	0.98	1.23	1.36	1.48*	1.61*	1.88*	2.01*	2.27*	3.03*	3.79*
	30	0.96	1.10	1.39	1.53	1.67*	1.82*	2.13*	2.29*	2.59*	3.50*	4.43*
	40	1.05	1.20	1.52	1.68	1.83*	2.01*	2.36*	2.53*	2.88*	3.93*	5.02*
	60	1.19	1.37	1.74	1.93	2.11*	2.32*	2.74*	2.96*	3.38*	4.71*	6.10*
	70	1.25	1.44	1.84	2.04	2.24*	2.46*	2.92*	3.15*	3.62*	5.07*	6.61*
	80	1.30	1.51	1.93	2.14	2.36*	2.60*	3.09*	3.34*	3.85*	5.43*	7.11*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.5 m (RADIUS = 1.8 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
150 (m*s) ^{1/2}	5	0.66	0.76	0.95	1.04	1.13*	1.23*	1.42*	1.52*	1.70*	2.22*	2.72*
	10	0.79	0.90	1.12	1.23	1.33*	1.45*	1.68*	1.80*	2.01*	2.65*	3.25*
	20	0.95	1.08	1.35	1.49	1.61*	1.76*	2.04*	2.18*	2.46*	3.26*	4.04*
	30	1.07	1.22	1.53	1.68	1.83*	1.99*	2.32*	2.48*	2.80*	3.75*	4.70*
	40	1.17	1.34	1.67	1.84	2.00*	2.19*	2.56*	2.74*	3.10*	4.19*	5.29*
	60	1.33	1.52	1.92	2.11	2.31*	2.53*	2.97*	3.19*	3.63*	4.97*	6.37*
	70	1.40	1.60	2.02	2.23	2.44*	2.68*	3.15*	3.39*	3.87*	5.33*	6.87*
	80	1.46	1.68	2.12	2.35	2.57*	2.82*	3.33*	3.58*	4.10*	5.69*	7.36*
200	5	0.71	0.81	1.01	1.11	1.20*	1.30*	1.51*	1.61*	1.80*	2.34*	2.86*
	10	0.85	0.96	1.20	1.31	1.42*	1.55*	1.79*	1.91*	2.14*	2.80*	3.43*
	20	1.03	1.17	1.45	1.59	1.73*	1.88*	2.18*	2.33*	2.61*	3.45*	4.26*
	30	1.16	1.32	1.64	1.80	1.95*	2.13*	2.48*	2.65*	2.98*	3.96*	4.93*
	40	1.27	1.44	1.80	1.98	2.15*	2.34*	2.73*	2.92*	3.30*	4.41*	5.53*
	60	1.45	1.65	2.06	2.27	2.47*	2.70*	3.16*	3.39*	3.84*	5.21*	6.61*
	70	1.52	1.74	2.18	2.40	2.61*	2.86*	3.35*	3.60*	4.09*	5.57*	7.11*
	80	1.59	1.82	2.28	2.51	2.74*	3.01*	3.53*	3.79*	4.32*	5.93*	7.60*
250	5	0.75	0.85	1.06	1.16	1.26*	1.37*	1.58*	1.68*	1.88*	2.45*	2.98*
	10	0.90	1.02	1.27	1.38	1.50*	1.63*	1.88*	2.01*	2.25*	2.93*	3.59*
	20	1.09	1.24	1.54	1.68	1.82*	1.98*	2.30*	2.45*	2.75*	3.62*	4.45*
	30	1.24	1.40	1.74	1.91	2.07*	2.25*	2.61*	2.79*	3.13*	4.15*	5.14*
	40	1.35	1.54	1.91	2.09	2.27*	2.47*	2.88*	3.07*	3.46*	4.61*	5.75*
	60	1.54	1.76	2.19	2.40	2.61*	2.85*	3.33*	3.56*	4.03*	5.42*	6.84*
	70	1.62	1.85	2.31	2.54	2.76*	3.02*	3.52*	3.78*	4.28*	5.79*	7.35*
	80	1.70	1.94	2.42	2.66	2.90*	3.17*	3.71*	3.98*	4.52*	6.15*	7.83*
300	5	0.78	0.89	1.11	1.21	1.31*	1.42*	1.64*	1.75*	1.96*	2.54*	3.09*
	10	0.94	1.07	1.32	1.45	1.57*	1.70*	1.96*	2.09*	2.34*	3.05*	3.73*
	20	1.15	1.31	1.62	1.77	1.91*	2.08*	2.40*	2.56*	2.87*	3.76*	4.62*
	30	1.30	1.48	1.83	2.00	2.17*	2.36*	2.73*	2.91*	3.27*	4.32*	5.34*
	40	1.43	1.62	2.01	2.20	2.38*	2.59*	3.01*	3.21*	3.61*	4.79*	5.96*
	60	1.63	1.85	2.30	2.52	2.73*	2.98*	3.47*	3.72*	4.20*	5.62*	7.06*
	70	1.72	1.95	2.43	2.66	2.89*	3.16*	3.68*	3.94*	4.46*	6.00*	7.57*
	80	1.80	2.04	2.55	2.79	3.03*	3.32*	3.87*	4.15*	4.70*	6.36*	8.05*
400	5	0.84	0.95	1.18	1.29	1.40*	1.52*	1.75*	1.86*	2.08*	2.70*	3.28*
	10	1.02	1.15	1.43	1.56	1.68*	1.83*	2.11*	2.24*	2.51*	3.26*	3.97*
	20	1.25	1.42	1.75	1.90	2.06*	2.24*	2.58*	2.75*	3.08*	4.02*	4.93*
	30	1.42	1.61	1.98	2.16	2.34*	2.54*	2.94*	3.13*	3.51*	4.61*	5.68*
	40	1.56	1.76	2.18	2.38	2.57*	2.80*	3.24*	3.45*	3.88*	5.11*	6.32*
	60	1.78	2.02	2.49	2.73	2.95*	3.22*	3.74*	3.99*	4.49*	5.98*	7.45*
	70	1.88	2.13	2.63	2.88	3.12*	3.40*	3.96*	4.23*	4.77*	6.37*	7.97*
	80	1.96	2.23	2.76	3.02	3.27*	3.57*	4.16*	4.45*	5.02*	6.73*	8.46*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.5 m (RADIUS = 1.8 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX
 TEMPERATURE RISE

CEILING HEIGHT, m

(m*s)^{1/2}

°C

2

4

5

6

7

9

10

12

18

24

0

5

10

20

30

40

60

70

80

10

5

10

20

30

40

60

70

80

20

5

10

20

30

40

60

70

80

50

5

10

20

30

40

60

70

80

100

5

10

20

30

40

60

70

80

0.42	0.52	0.74	0.85	0.96*	1.07*	1.30*	1.41*	1.63*	2.30*	2.97*
0.48	0.61	0.89	1.04	1.18*	1.32*	1.61*	1.76*	2.05*	2.96*	3.89*
0.58	0.77	1.15	1.34	1.54*	1.74*	2.15*	2.35*	2.77*	4.07*	5.42*
0.67	0.90	1.37	1.61	1.86*	2.10*	2.61*	2.87*	3.40*	5.04*	6.77*
0.75	1.02	1.57	1.86	2.15*	2.44*	3.04*	3.35*	3.97*	5.94*	8.01*
0.90	1.24	1.95	2.31	2.68*	3.05*	3.83*	4.22*	5.03*	7.58*	10.27*
0.97	1.35	2.12	2.52	2.93*	3.34*	4.19*	4.63*	5.52*	8.34*	11.33*
1.04	1.45	2.29	2.72	3.17*	3.62*	4.55*	5.03*	6.00*	9.08*	12.35*
0.58	0.67	0.88	0.99	1.09*	1.20*	1.42*	1.53*	1.75*	2.41*	3.08*
0.66	0.78	1.03	1.16	1.30*	1.44*	1.72*	1.87*	2.16*	3.05*	3.97*
0.78	0.93	1.27	1.45	1.64*	1.84*	2.24*	2.44*	2.86*	4.15*	5.50*
0.87	1.06	1.48	1.71	1.95*	2.19*	2.70*	2.95*	3.48*	5.11*	6.84*
0.95	1.17	1.68	1.95	2.23*	2.52*	3.12*	3.43*	4.05*	6.00*	8.07*
1.10	1.39	2.04	2.39	2.76*	3.13*	3.90*	4.29*	5.10*	7.64*	10.33*
1.17	1.49	2.21	2.60	3.00*	3.41*	4.26*	4.70*	5.59*	8.40*	11.38*
1.23	1.58	2.38	2.80	3.24*	3.69*	4.61*	5.09*	6.06*	9.14*	12.40*
0.64	0.74	0.96	1.07	1.18*	1.29*	1.52*	1.63*	1.85*	2.51*	3.18*
0.74	0.87	1.13	1.26	1.39*	1.54*	1.82*	1.96*	2.25*	3.14*	4.06*
0.88	1.04	1.38	1.56	1.74*	1.93*	2.33*	2.53*	2.94*	4.23*	5.57*
0.99	1.18	1.59	1.81	2.04*	2.28*	2.78*	3.03*	3.55*	5.18*	6.90*
1.08	1.30	1.78	2.05	2.32*	2.61*	3.20*	3.50*	4.12*	6.07*	8.13*
1.24	1.51	2.14	2.48	2.83*	3.20*	3.97*	4.36*	5.16*	7.70*	10.38*
1.31	1.61	2.31	2.69	3.08*	3.49*	4.33*	4.76*	5.65*	8.46*	11.44*
1.38	1.71	2.47	2.88	3.31*	3.76*	4.68*	5.15*	6.12*	9.19*	12.46*
0.76	0.87	1.11	1.23	1.35*	1.47*	1.71*	1.83*	2.07*	2.76*	3.44*
0.89	1.03	1.32	1.46	1.60*	1.75*	2.05*	2.20*	2.50*	3.40*	4.31*
1.08	1.25	1.61	1.79	1.97*	2.17*	2.57*	2.77*	3.18*	4.45*	5.79*
1.21	1.41	1.84	2.05	2.28*	2.52*	3.02*	3.27*	3.78*	5.39*	7.10*
1.33	1.55	2.04	2.29	2.55*	2.84*	3.42*	3.72*	4.34*	6.27*	8.31*
1.52	1.79	2.40	2.72	3.06*	3.42*	4.18*	4.56*	5.36*	7.87*	10.55*
1.60	1.90	2.57	2.92	3.29*	3.70*	4.53*	4.96*	5.84*	8.63*	11.60*
1.68	2.00	2.72	3.12	3.52*	3.97*	4.88*	5.35*	6.31*	9.36*	12.61*
0.88	1.01	1.27	1.40	1.52*	1.66*	1.93*	2.06*	2.31*	3.05*	3.77*
1.05	1.20	1.52	1.67	1.82*	1.99*	2.31*	2.48*	2.80*	3.74*	4.67*
1.28	1.47	1.86	2.05	2.24*	2.46*	2.88*	3.09*	3.52*	4.81*	6.13*
1.45	1.66	2.12	2.35	2.58*	2.83*	3.35*	3.60*	4.12*	5.73*	7.42*
1.58	1.83	2.34	2.61	2.87*	3.16*	3.76*	4.06*	4.67*	6.59*	8.62*
1.81	2.11	2.73	3.06	3.38*	3.75*	4.51*	4.89*	5.68*	8.17*	10.82*
1.91	2.23	2.91	3.26	3.62*	4.03*	4.85*	5.28*	6.15*	8.91*	11.86*
2.00	2.34	3.07	3.46	3.85*	4.29*	5.19*	5.66*	6.61*	9.63*	12.87*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.5 m (RADIUS = 1.8 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 (m*s) ^{1/2}	°C												
	5	0.97	1.11	1.39	1.52	1.65*	1.80*	2.08*	2.22*	2.49*	3.28*	4.03*	
	10	1.16	1.33	1.66	1.83	1.98*	2.16*	2.51*	2.68*	3.02*	4.01*	4.97*	
	20	1.42	1.63	2.04	2.25	2.45*	2.68*	3.12*	3.35*	3.79*	5.11*	6.45*	
	30	1.61	1.85	2.33	2.57	2.81*	3.08*	3.61*	3.88*	4.41*	6.04*	7.73*	
	40	1.77	2.03	2.58	2.85	3.12*	3.42*	4.04*	4.35*	4.97*	6.89*	8.91*	
	60	2.03	2.34	2.99	3.32	3.66*	4.03*	4.80*	5.19*	5.98*	8.46*	11.10*	
	70	2.14	2.47	3.18	3.54	3.90*	4.31*	5.15*	5.58*	6.44*	9.19*	12.13*	
80	2.24	2.60	3.35	3.74	4.13*	4.58*	5.49*	5.95*	6.90*	9.90*	13.12*		
200	5	1.04	1.18	1.48	1.62	1.76*	1.91*	2.21*	2.36*	2.64*	3.46*	4.24*	
	10	1.26	1.43	1.78	1.95	2.12*	2.31*	2.67*	2.85*	3.21*	4.23*	5.23*	
	20	1.54	1.76	2.19	2.41	2.62*	2.86*	3.33*	3.56*	4.02*	5.38*	6.74*	
	30	1.75	2.00	2.51	2.75	3.00*	3.28*	3.84*	4.11*	4.66*	6.32*	8.02*	
	40	1.92	2.20	2.77	3.05	3.33*	3.65*	4.28*	4.60*	5.23*	7.18*	9.20*	
	60	2.21	2.53	3.21	3.55	3.89*	4.28*	5.06*	5.45*	6.25*	8.73*	11.37*	
	70	2.33	2.67	3.40	3.77	4.14*	4.56*	5.41*	5.85*	6.72*	9.46*	12.39*	
	80	2.44	2.81	3.59	3.98	4.38*	4.83*	5.75*	6.22*	7.17*	10.17*	13.38*	
250	5	1.10	1.25	1.56	1.70	1.85*	2.01*	2.32*	2.47*	2.77*	3.62*	4.43*	
	10	1.33	1.52	1.88	2.06	2.23*	2.43*	2.81*	3.00*	3.37*	4.43*	5.46*	
	20	1.64	1.87	2.32	2.55	2.76*	3.01*	3.50*	3.74*	4.22*	5.62*	7.00*	
	30	1.87	2.13	2.66	2.91	3.17*	3.46*	4.04*	4.32*	4.89*	6.58*	8.30*	
	40	2.05	2.34	2.93	3.22	3.51*	3.84*	4.50*	4.82*	5.47*	7.44*	9.47*	
	60	2.36	2.70	3.40	3.75	4.09*	4.49*	5.29*	5.70*	6.50*	9.00*	11.63*	
	70	2.49	2.85	3.60	3.98	4.35*	4.79*	5.66*	6.09*	6.98*	9.73*	12.64*	
	80	2.61	2.99	3.79	4.20	4.60*	5.06*	6.00*	6.47*	7.43*	10.43*	13.63*	
300	5	1.15	1.31	1.63	1.78	1.93*	2.09*	2.42*	2.58*	2.88*	3.76*	4.59*	
	10	1.40	1.59	1.97	2.16	2.33*	2.54*	2.94*	3.13*	3.51*	4.61*	5.66*	
	20	1.73	1.97	2.44	2.67	2.89*	3.15*	3.66*	3.91*	4.40*	5.83*	7.25*	
	30	1.97	2.24	2.79	3.06	3.32*	3.62*	4.21*	4.51*	5.09*	6.82*	8.56*	
	40	2.17	2.47	3.08	3.38	3.67*	4.01*	4.69*	5.02*	5.69*	7.69*	9.74*	
	60	2.49	2.84	3.56	3.92	4.28*	4.69*	5.51*	5.92*	6.74*	9.26*	11.89*	
	70	2.63	3.00	3.78	4.16	4.55*	4.99*	5.88*	6.32*	7.22*	9.98*	12.90*	
	80	2.75	3.15	3.98	4.39	4.80*	5.27*	6.23*	6.71*	7.68*	10.69*	13.87*	
400	5	1.25	1.41	1.75	1.91	2.06*	2.24*	2.59*	2.75*	3.08*	4.00*	4.88*	
	10	1.52	1.72	2.13	2.32	2.51*	2.73*	3.15*	3.36*	3.76*	4.92*	6.02*	
	20	1.89	2.14	2.64	2.88	3.12*	3.39*	3.93*	4.19*	4.71*	6.21*	7.68*	
	30	2.15	2.44	3.02	3.30	3.57*	3.90*	4.53*	4.83*	5.44*	7.24*	9.03*	
	40	2.37	2.69	3.33	3.65	3.96*	4.32*	5.03*	5.38*	6.07*	8.14*	10.22*	
	60	2.72	3.09	3.86	4.23	4.60*	5.03*	5.89*	6.31*	7.16*	9.73*	12.38*	
	70	2.87	3.27	4.08	4.49	4.89*	5.35*	6.27*	6.73*	7.65*	10.46*	13.39*	
	80	3.01	3.43	4.30	4.73	5.15*	5.65*	6.63*	7.13*	8.12*	11.17*	14.36*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.5 m (RADIUS = 1.8 m)³
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX
 TEMPERATURE RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	0	1	2	4	5	6	7	9	10	12	18	24
0	0.61	0.78	1.13	1.31	1.49*	1.67*	2.03*	2.21*	2.57*	3.42*	3.69*	4.83*
	0.74	0.96	1.43	1.67	1.92*	2.16*	2.66*	2.91*	3.42*	3.69*	5.01*	6.66*
	0.94	1.27	1.94	2.28	2.64*	2.99*	3.72*	4.10*	4.86*	5.01*	7.23*	9.73*
	1.12	1.53	2.38	2.82	3.27*	3.72*	4.66*	5.14*	6.11*	6.11*	9.18*	12.43*
	1.28	1.77	2.79	3.31	3.85*	4.40*	5.52*	6.09*	7.27*	7.27*	10.97*	14.90*
	1.58	2.22	3.53	4.22	4.91*	5.62*	7.09*	7.84*	9.38*	9.38*	14.25*	19.43*
	1.72	2.43	3.88	4.64	5.41*	6.20*	7.82*	8.66*	10.37*	10.37*	15.78*	21.55*
	1.85	2.63	4.22	5.04	5.89*	6.75*	8.53*	9.45*	11.32*	11.32*	17.26*	23.59*
10	0.83	0.97	1.30	1.46	1.63*	1.80*	2.16*	2.33*	2.69*	3.53*	3.80*	4.94*
	0.97	1.16	1.58	1.81	2.04*	2.28*	2.77*	3.02*	3.53*	4.94*	5.10*	6.75*
	1.18	1.45	2.07	2.40	2.74*	3.09*	3.82*	4.19*	4.94*	6.19*	7.31*	9.81*
	1.35	1.70	2.50	2.92	3.36*	3.81*	4.74*	5.22*	6.19*	7.34*	9.25*	12.49*
	1.51	1.93	2.90	3.41	3.94*	4.48*	5.60*	6.17*	7.34*	8.51*	11.04*	14.96*
	1.79	2.37	3.63	4.30	4.99*	5.70*	7.16*	7.91*	9.45*	10.43*	14.31*	19.49*
	1.92	2.57	3.98	4.72	5.49*	6.27*	7.89*	8.72*	10.43*	11.44*	15.84*	21.60*
	2.05	2.77	4.31	5.13	5.96*	6.82*	8.60*	9.51*	11.38*	12.44*	17.31*	23.64*
20	0.93	1.08	1.41	1.58	1.74*	1.92*	2.27*	2.45*	2.81*	3.63*	3.91*	5.04*
	1.09	1.29	1.71	1.93	2.15*	2.39*	2.88*	3.13*	3.63*	4.94*	5.20*	6.84*
	1.33	1.59	2.19	2.51	2.84*	3.19*	3.91*	4.28*	5.03*	6.27*	7.39*	9.88*
	1.52	1.85	2.61	3.03	3.45*	3.90*	4.83*	5.30*	6.27*	7.41*	9.32*	12.56*
	1.68	2.08	3.01	3.51	4.02*	4.56*	5.67*	6.25*	7.41*	8.51*	11.10*	15.03*
	1.97	2.51	3.73	4.39	5.07*	5.78*	7.23*	7.98*	9.51*	10.50*	14.37*	19.54*
	2.11	2.71	4.07	4.81	5.56*	6.34*	7.96*	8.79*	10.50*	11.44*	15.90*	21.66*
	2.23	2.90	4.40	5.21	6.04*	6.89*	8.66*	9.58*	11.44*	12.44*	17.37*	23.70*
50	1.11	1.28	1.63	1.81	1.98*	2.17*	2.55*	2.73*	3.10*	3.92*	4.21*	5.34*
	1.32	1.53	1.98	2.20	2.43*	2.67*	3.17*	3.41*	3.92*	5.29*	5.47*	7.09*
	1.62	1.90	2.49	2.80	3.12*	3.47*	4.18*	4.54*	5.29*	6.50*	7.62*	10.10*
	1.85	2.18	2.92	3.31	3.72*	4.16*	5.08*	5.54*	6.50*	7.63*	9.54*	12.76*
	2.04	2.43	3.31	3.78	4.28*	4.81*	5.91*	6.47*	7.63*	9.71*	11.30*	15.21*
	2.37	2.87	4.02	4.65	5.30*	6.00*	7.44*	8.19*	9.71*	11.63*	14.55*	19.71*
	2.51	3.07	4.35	5.05	5.78*	6.56*	8.16*	8.99*	10.69*	12.63*	16.07*	21.82*
	2.65	3.26	4.67	5.45	6.25*	7.10*	8.86*	9.77*	11.63*	13.63*	17.54*	23.85*
100	1.29	1.48	1.87	2.06	2.25*	2.46*	2.86*	3.06*	3.45*	4.32*	4.62*	5.77*
	1.56	1.80	2.28	2.52	2.75*	3.01*	3.54*	3.80*	4.32*	5.69*	5.89*	7.51*
	1.93	2.23	2.86	3.17	3.50*	3.85*	4.58*	4.94*	5.69*	7.09*	8.01*	10.46*
	2.20	2.56	3.32	3.71	4.11*	4.56*	5.47*	5.93*	7.09*	8.88*	9.89*	13.09*
	2.43	2.84	3.72	4.19	4.66*	5.19*	6.28*	6.84*	8.19*	10.04*	11.63*	15.52*
	2.81	3.32	4.44	5.05	5.67*	6.36*	7.79*	8.52*	10.04*	12.04*	14.84*	19.99*
	2.97	3.53	4.77	5.45	6.15*	6.91*	8.50*	9.32*	11.00*	13.00*	16.35*	22.08*
	3.13	3.74	5.09	5.83	6.61*	7.45*	9.19*	10.09*	11.93*	14.00*	17.81*	24.11*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.5 m (RADIUS = 1.8 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

CEILING HEIGHT, m

RESPONSE TEMPERATURE
TIME INDEX RISE

(m*s) ^{1/2}	1	2	4	5	6	7	9	10	12	18	24
150	1.43	1.63	2.05	2.25	2.44*	2.66*	3.10*	3.31*	3.72*	4.94*	6.12*
	1.74	1.99	2.50	2.75	2.99*	3.27*	3.82*	4.10*	4.64*	6.25*	7.88*
	2.15	2.47	3.13	3.46	3.79*	4.17*	4.91*	5.29*	6.04*	8.37*	10.81*
	2.46	2.83	3.63	4.03	4.43*	4.89*	5.82*	6.28*	7.24*	10.23*	13.41*
	2.71	3.14	4.05	4.52	5.00*	5.54*	6.63*	7.19*	8.33*	11.95*	15.82*
	3.13	3.66	4.80	5.40	6.02*	6.71*	8.13*	8.86*	10.36*	15.14*	20.26*
	3.32	3.89	5.14	5.80	6.49*	7.25*	8.83*	9.64*	11.31*	16.64*	22.35*
	3.49	4.11	5.46	6.19	6.94*	7.78*	9.51*	10.40*	12.23*	18.09*	24.37*
200	1.54	1.75	2.19	2.40	2.60*	2.84*	3.29*	3.51*	3.94*	5.21*	6.43*
	1.88	2.14	2.68	2.94	3.20*	3.49*	4.06*	4.35*	4.91*	6.57*	8.23*
	2.33	2.67	3.36	3.70	4.04*	4.43*	5.20*	5.59*	6.36*	8.71*	11.15*
	2.67	3.06	3.88	4.30	4.71*	5.18*	6.13*	6.60*	7.56*	10.56*	13.73*
	2.94	3.39	4.33	4.81	5.29*	5.84*	6.95*	7.51*	8.66*	12.27*	16.12*
	3.40	3.95	5.11	5.71	6.33*	7.02*	8.45*	9.18*	10.67*	15.43*	20.54*
	3.60	4.19	5.46	6.12	6.80*	7.57*	9.14*	9.95*	11.62*	16.92*	22.62*
	3.78	4.42	5.79	6.51	7.26*	8.09*	9.82*	10.71*	12.53*	18.36*	24.62*
250	1.63	1.85	2.31	2.53	2.74*	2.98*	3.45*	3.68*	4.14*	5.44*	6.70*
	2.00	2.27	2.83	3.11	3.37*	3.68*	4.27*	4.57*	5.15*	6.85*	8.54*
	2.49	2.84	3.55	3.91	4.26*	4.66*	5.46*	5.85*	6.64*	9.02*	11.48*
	2.84	3.26	4.11	4.53	4.95*	5.44*	6.40*	6.89*	7.87*	10.88*	14.04*
	3.14	3.61	4.58	5.07	5.56*	6.12*	7.24*	7.81*	8.97*	12.58*	16.42*
	3.63	4.19	5.38	5.99	6.61*	7.31*	8.75*	9.48*	10.98*	15.72*	20.81*
	3.84	4.45	5.74	6.41	7.09*	7.86*	9.45*	10.26*	11.92*	17.20*	22.88*
	4.04	4.69	6.08	6.81	7.55*	8.39*	10.12*	11.01*	12.83*	18.64*	24.88*
300	1.71	1.94	2.41	2.64	2.86*	3.11*	3.60*	3.84*	4.31*	5.65*	6.94*
	2.10	2.39	2.97	3.25	3.52*	3.84*	4.46*	4.76*	5.36*	7.11*	8.83*
	2.62	2.99	3.73	4.09	4.45*	4.87*	5.68*	6.09*	6.90*	9.32*	11.79*
	3.00	3.43	4.31	4.74	5.17*	5.67*	6.66*	7.15*	8.14*	11.18*	14.35*
	3.32	3.80	4.80	5.29	5.79*	6.37*	7.51*	8.09*	9.26*	12.88*	16.71*
	3.83	4.41	5.63	6.25	6.87*	7.58*	9.03*	9.77*	11.27*	16.01*	21.08*
	4.05	4.68	6.00	6.67	7.36*	8.14*	9.73*	10.55*	12.21*	17.48*	23.14*
	4.26	4.93	6.35	7.08	7.82*	8.67*	10.41*	11.29*	13.11*	18.91*	25.13*
400	1.85	2.10	2.60	2.84	3.07*	3.34*	3.86*	4.11*	4.60*	6.02*	7.37*
	2.29	2.59	3.21	3.50	3.79*	4.13*	4.78*	5.10*	5.73*	7.56*	9.35*
	2.86	3.25	4.03	4.42	4.79*	5.23*	6.09*	6.51*	7.35*	9.85*	12.37*
	3.28	3.73	4.65	5.11	5.56*	6.08*	7.11*	7.62*	8.65*	11.75*	14.94*
	3.62	4.13	5.18	5.70	6.21*	6.81*	8.00*	8.59*	9.79*	13.45*	17.29*
	4.18	4.79	6.06	6.70	7.34*	8.07*	9.55*	10.30*	11.82*	16.57*	21.62*
	4.43	5.08	6.45	7.14	7.84*	8.64*	10.26*	11.09*	12.76*	18.03*	23.66*
	4.65	5.35	6.82	7.56	8.32*	9.18*	10.94*	11.84*	13.66*	19.44*	25.64*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.5 m (RADIUS = 1.8 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	1	2	4	5	6	7	9	10	12	18	24
0	0.93	1.21	1.79	2.09	2.39*	2.69*	3.30*	3.62*	4.24*	6.19*	8.20*
	1.17	1.57	2.39	2.82	3.25*	3.68*	4.57*	5.03*	5.95*	8.83*	11.86*
	1.58	2.18	3.41	4.04	4.69*	5.35*	6.70*	7.40*	8.81*	13.28*	18.00*
	1.94	2.71	4.29	5.11	5.95*	6.81*	8.57*	9.48*	11.33*	17.17*	23.39*
	2.26	3.20	5.11	6.10	7.11*	8.15*	10.29*	11.39*	13.63*	20.75*	28.34*
	2.86	4.09	6.60	7.90	9.24*	10.61*	13.43*	14.88*	17.86*	27.30*	37.40*
	3.14	4.51	7.30	8.75	10.23*	11.76*	14.90*	16.52*	19.83*	30.37*	41.63*
	3.41	4.91	7.97	9.56	11.19*	12.87*	16.32*	18.09*	21.74*	33.32*	45.72*
10	1.21	1.44	1.97	2.25	2.53*	2.83*	3.44*	3.74*	4.37*	6.30*	8.31*
	1.46	1.79	2.55	2.95	3.37*	3.80*	4.68*	5.13*	6.05*	8.92*	11.94*
	1.85	2.37	3.54	4.16	4.79*	5.45*	6.80*	7.49*	8.90*	13.35*	18.08*
	2.19	2.88	4.41	5.22	6.05*	6.90*	8.66*	9.56*	11.41*	17.24*	23.46*
	2.50	3.36	5.22	6.20	7.20*	8.24*	10.37*	11.46*	13.71*	20.82*	28.40*
	3.08	4.24	6.70	7.99	9.32*	10.68*	13.50*	14.95*	17.93*	27.37*	37.45*
	3.35	4.65	7.39	8.83	10.31*	11.83*	14.97*	16.58*	19.90*	30.43*	41.68*
	3.61	5.05	8.06	9.64	11.27*	12.94*	16.38*	18.16*	21.80*	33.38*	45.77*
20	1.36	1.60	2.12	2.39	2.67*	2.96*	3.56*	3.87*	4.49*	6.41*	8.41*
	1.64	1.96	2.69	3.09	3.49*	3.92*	4.79*	5.24*	6.16*	9.02*	12.03*
	2.06	2.54	3.66	4.27	4.90*	5.55*	6.89*	7.58*	8.99*	13.43*	18.15*
	2.40	3.05	4.53	5.32	6.14*	6.99*	8.74*	9.64*	11.48*	17.32*	23.52*
	2.71	3.52	5.33	6.29	7.29*	8.32*	10.45*	11.54*	13.78*	20.88*	28.46*
	3.28	4.38	6.80	8.08	9.40*	10.76*	13.57*	15.02*	17.99*	27.43*	37.51*
	3.55	4.79	7.49	8.92	10.39*	11.90*	15.04*	16.65*	19.96*	30.48*	41.74*
	3.81	5.18	8.15	9.72	11.34*	13.01*	16.45*	18.22*	21.86*	33.44*	45.82*
50	1.63	1.89	2.44	2.72	3.00*	3.30*	3.91*	4.21*	4.83*	6.73*	8.72*
	1.98	2.32	3.05	3.43	3.82*	4.25*	5.11*	5.56*	6.46*	9.30*	12.29*
	2.48	2.96	4.02	4.60	5.20*	5.84*	7.17*	7.85*	9.25*	13.67*	18.37*
	2.87	3.48	4.87	5.63	6.42*	7.26*	8.99*	9.89*	11.72*	17.53*	23.72*
	3.21	3.95	5.65	6.58	7.55*	8.57*	10.68*	11.77*	14.00*	21.08*	28.65*
	3.80	4.80	7.09	8.34	9.63*	10.99*	13.79*	15.23*	18.19*	27.60*	37.68*
	4.07	5.19	7.77	9.17	10.61*	12.12*	15.24*	16.85*	20.15*	30.66*	41.90*
	4.33	5.58	8.43	9.97	11.56*	13.22*	16.65*	18.42*	22.05*	33.60*	45.98*
100	1.92	2.20	2.80	3.09	3.38*	3.71*	4.35*	4.67*	5.30*	7.23*	9.21*
	2.35	2.72	3.49	3.88	4.27*	4.71*	5.59*	6.03*	6.93*	9.75*	12.72*
	2.94	3.44	4.52	5.08	5.66*	6.30*	7.61*	8.29*	9.67*	14.06*	18.73*
	3.40	4.01	5.37	6.10	6.86*	7.69*	9.41*	10.29*	12.11*	17.88*	24.05*
	3.78	4.51	6.15	7.04	7.97*	8.98*	11.07*	12.15*	14.36*	21.41*	28.95*
	4.44	5.39	7.57	8.77	10.02*	11.36*	14.14*	15.57*	18.52*	27.90*	37.95*
	4.73	5.79	8.23	9.58	10.99*	12.48*	15.58*	17.18*	20.47*	30.94*	42.17*
	5.00	6.17	8.88	10.37	11.92*	13.57*	16.98*	18.74*	22.36*	33.88*	46.24*

SPACING = 2.5 m (RADIUS = 1.8 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 150	°C												
	5	2.12	2.43	3.06	3.37	3.67*	4.02*	4.69*	5.02*	5.69*	7.66*	9.66*	
	10	2.61	3.00	3.81	4.22	4.62*	5.08*	5.98*	6.44*	7.36*	10.18*	13.14*	
	20	3.28	3.80	4.91	5.48	6.06*	6.71*	8.03*	8.70*	10.08*	14.44*	19.09*	
	30	3.78	4.42	5.80	6.52	7.27*	8.10*	9.81*	10.69*	12.49*	18.23*	24.38*	
	40	4.21	4.95	6.59	7.46	8.37*	9.37*	11.45*	12.52*	14.72*	21.74*	29.26*	
	60	4.92	5.87	8.01	9.18	10.40*	11.73*	14.49*	15.91*	18.85*	28.20*	38.23*	
	70	5.23	6.28	8.67	9.98	11.35*	12.84*	15.92*	17.51*	20.79*	31.23*	42.44*	
200	80	5.53	6.68	9.31	10.76	12.28*	13.91*	17.30*	19.06*	22.66*	34.16*	46.49*	
	5	2.29	2.61	3.27	3.60	3.91*	4.27*	4.98*	5.32*	6.01*	8.04*	10.07*	
	10	2.83	3.24	4.08	4.50	4.92*	5.39*	6.33*	6.79*	7.73*	10.58*	13.54*	
	20	3.56	4.10	5.24	5.82	6.41*	7.07*	8.41*	9.09*	10.47*	14.82*	19.45*	
	30	4.10	4.76	6.16	6.89	7.64*	8.47*	10.19*	11.06*	12.86*	18.58*	24.71*	
	40	4.56	5.32	6.97	7.85	8.74*	9.75*	11.82*	12.89*	15.08*	22.07*	29.56*	
	60	5.32	6.28	8.41	9.56	10.76*	12.09*	14.83*	16.25*	19.17*	28.50*	38.51*	
	70	5.65	6.71	9.08	10.37	11.71*	13.19*	16.25*	17.84*	21.10*	31.52*	42.70*	
250	80	5.96	7.12	9.72	11.14	12.63*	14.25*	17.63*	19.37*	22.97*	34.44*	46.75*	
	5	2.43	2.77	3.46	3.79	4.12*	4.49*	5.22*	5.58*	6.29*	8.38*	10.44*	
	10	3.01	3.44	4.32	4.75	5.18*	5.66*	6.63*	7.11*	8.07*	10.96*	13.93*	
	20	3.79	4.36	5.53	6.13	6.72*	7.40*	8.76*	9.45*	10.84*	15.19*	19.81*	
	30	4.37	5.05	6.49	7.23	7.97*	8.82*	10.55*	11.43*	13.23*	18.92*	25.03*	
	40	4.86	5.64	7.32	8.20	9.09*	10.10*	12.18*	13.24*	15.43*	22.39*	29.87*	
	60	5.66	6.64	8.79	9.93	11.12*	12.44*	15.17*	16.59*	19.50*	28.79*	38.79*	
	70	6.01	7.09	9.46	10.73	12.06*	13.53*	16.58*	18.16*	21.41*	31.80*	42.97*	
300	80	6.34	7.51	10.10	11.50	12.97*	14.59*	17.95*	19.69*	23.27*	34.71*	47.01*	
	5	2.56	2.91	3.62	3.97	4.30*	4.69*	5.45*	5.82*	6.55*	8.68*	10.78*	
	10	3.18	3.62	4.52	4.97	5.41*	5.91*	6.90*	7.39*	8.37*	11.31*	14.30*	
	20	4.00	4.58	5.79	6.40	7.00*	7.69*	9.08*	9.78*	11.18*	15.55*	20.16*	
	30	4.61	5.31	6.78	7.53	8.28*	9.14*	10.88*	11.77*	13.57*	19.26*	25.35*	
	40	5.12	5.93	7.64	8.52	9.42*	10.44*	12.52*	13.58*	15.77*	22.71*	30.17*	
	60	5.97	6.97	9.13	10.27	11.45*	12.77*	15.51*	16.91*	19.81*	29.09*	39.06*	
	70	6.34	7.43	9.81	11.08	12.39*	13.86*	16.91*	18.48*	21.72*	32.09*	43.23*	
400	80	6.68	7.86	10.46	11.85	13.30*	14.92*	18.27*	20.00*	23.57*	34.99*	47.27*	
	5	2.78	3.15	3.90	4.27	4.62*	5.03*	5.83*	6.22*	6.99*	9.22*	11.40*	
	10	3.46	3.93	4.89	5.35	5.81*	6.34*	7.38*	7.90*	8.92*	11.94*	14.99*	
	20	4.36	4.98	6.25	6.88	7.50*	8.22*	9.65*	10.37*	11.81*	16.23*	20.84*	
	30	5.03	5.77	7.30	8.07	8.83*	9.72*	11.50*	12.40*	14.23*	19.93*	25.99*	
	40	5.59	6.43	8.20	9.10	10.00*	11.05*	13.16*	14.23*	16.42*	23.35*	30.77*	
	60	6.50	7.54	9.75	10.90	12.07*	13.41*	16.15*	17.55*	20.44*	29.67*	39.61*	
	70	6.90	8.03	10.44	11.71	13.02*	14.50*	17.54*	19.11*	22.33*	32.65*	43.76*	
80	7.27	8.48	11.11	12.50	13.93*	15.55*	18.89*	20.62*	24.17*	35.53*	47.78*		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.0 m (RADIUS = 2.1 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	5	0.33	0.40	0.54	0.61	0.68	0.75	0.89*	0.96*	1.10*	1.52*	1.94*	
	10	0.37	0.45	0.62	0.71	0.80	0.88	1.06*	1.15*	1.33*	1.86*	2.41*	
	20	0.43	0.53	0.76	0.87	0.99	1.10	1.34*	1.46*	1.70*	2.43*	3.19*	
	30	0.48	0.61	0.88	1.02	1.16	1.30	1.58*	1.73*	2.02*	2.93*	3.88*	
	40	0.53	0.68	0.99	1.15	1.31	1.48	1.81*	1.98*	2.32*	3.39*	4.51*	
	60	0.61	0.80	1.19	1.39	1.60	1.80	2.22*	2.44*	2.87*	4.24*	5.67*	
	70	0.65	0.86	1.29	1.51	1.73	1.95	2.41*	2.65*	3.13*	4.63*	6.21*	
	80	0.69	0.92	1.38	1.61	1.86	2.10	2.60*	2.86*	3.38*	5.01*	6.73*	
10	5	0.46	0.52	0.66	0.73	0.80	0.86	1.01*	1.08*	1.22*	1.63*	2.04*	
	10	0.51	0.59	0.75	0.83	0.91	0.99	1.17*	1.25*	1.43*	1.95*	2.49*	
	20	0.59	0.68	0.88	0.99	1.09	1.20	1.43*	1.55*	1.78*	2.51*	3.26*	
	30	0.65	0.76	1.00	1.12	1.25	1.39	1.67*	1.81*	2.10*	3.00*	3.95*	
	40	0.70	0.83	1.10	1.25	1.40	1.56	1.89*	2.06*	2.40*	3.46*	4.57*	
	60	0.79	0.95	1.30	1.48	1.68	1.88	2.29*	2.51*	2.94*	4.30*	5.72*	
	70	0.83	1.00	1.39	1.59	1.81	2.03	2.48*	2.72*	3.19*	4.69*	6.26*	
	80	0.87	1.05	1.47	1.70	1.93	2.17	2.67*	2.92*	3.44*	5.07*	6.78*	
20	5	0.50	0.57	0.72	0.79	0.86	0.93	1.08*	1.15*	1.29*	1.72*	2.13*	
	10	0.57	0.65	0.82	0.90	0.99	1.07	1.25*	1.34*	1.51*	2.04*	2.58*	
	20	0.67	0.76	0.97	1.07	1.18	1.29	1.52*	1.63*	1.87*	2.59*	3.34*	
	30	0.74	0.85	1.09	1.21	1.34	1.47	1.75*	1.89*	2.18*	3.08*	4.01*	
	40	0.80	0.92	1.20	1.34	1.49	1.64	1.96*	2.13*	2.47*	3.53*	4.63*	
	60	0.90	1.05	1.39	1.57	1.76	1.95	2.36*	2.57*	3.00*	4.36*	5.78*	
	70	0.95	1.11	1.48	1.68	1.89	2.10	2.55*	2.78*	3.26*	4.74*	6.32*	
	80	0.99	1.17	1.57	1.78	2.01	2.24	2.73*	2.98*	3.50*	5.12*	6.83*	
50	5	0.59	0.66	0.82	0.90	0.98	1.06	1.22*	1.30*	1.45*	1.90*	2.34*	
	10	0.68	0.77	0.96	1.05	1.14	1.23	1.42*	1.51*	1.70*	2.25*	2.80*	
	20	0.81	0.92	1.14	1.25	1.36	1.47	1.71*	1.83*	2.08*	2.80*	3.55*	
	30	0.91	1.02	1.28	1.41	1.54	1.67	1.95*	2.10*	2.39*	3.28*	4.20*	
	40	0.98	1.12	1.40	1.55	1.70	1.85	2.17*	2.34*	2.67*	3.72*	4.82*	
	60	1.11	1.27	1.61	1.79	1.97	2.16	2.56*	2.77*	3.20*	4.53*	5.95*	
	70	1.17	1.34	1.71	1.90	2.10	2.30	2.75*	2.97*	3.44*	4.92*	6.48*	
	80	1.22	1.40	1.80	2.00	2.22	2.44	2.92*	3.17*	3.68*	5.29*	6.99*	
100	5	0.68	0.76	0.93	1.02	1.10	1.19	1.36*	1.45*	1.62*	2.11*	2.58*	
	10	0.80	0.89	1.10	1.20	1.30	1.39	1.60*	1.71*	1.91*	2.51*	3.08*	
	20	0.96	1.07	1.32	1.44	1.56	1.68	1.94*	2.07*	2.33*	3.09*	3.85*	
	30	1.08	1.21	1.49	1.63	1.77	1.90	2.21*	2.36*	2.66*	3.58*	4.51*	
	40	1.17	1.32	1.63	1.78	1.94	2.10	2.44*	2.61*	2.96*	4.02*	5.11*	
	60	1.33	1.50	1.87	2.05	2.24	2.43	2.84*	3.06*	3.49*	4.82*	6.22*	
	70	1.40	1.58	1.97	2.17	2.37	2.58	3.03*	3.26*	3.73*	5.19*	6.74*	
	80	1.46	1.65	2.07	2.28	2.50	2.72	3.21*	3.46*	3.96*	5.56*	7.24*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.0 m (RADIUS = 2.1 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 (m*s) ^{1/2}	5	0.74	0.83	1.01	1.11	1.19	1.28	1.47*	1.56*	1.74*	2.26*	2.76*	
	10	0.88	0.98	1.20	1.31	1.41	1.51	1.74*	1.85*	2.07*	2.70*	3.30*	
	20	1.06	1.19	1.45	1.58	1.71	1.83	2.11*	2.25*	2.52*	3.32*	4.11*	
	30	1.20	1.34	1.64	1.79	1.93	2.08	2.40*	2.56*	2.88*	3.83*	4.78*	
	40	1.31	1.46	1.80	1.96	2.12	2.29	2.65*	2.83*	3.19*	4.27*	5.38*	
	60	1.49	1.67	2.06	2.25	2.45	2.64	3.07*	3.29*	3.73*	5.08*	6.48*	
	70	1.57	1.76	2.17	2.38	2.59	2.80	3.27*	3.50*	3.98*	5.45*	6.99*	
	80	1.64	1.84	2.28	2.50	2.72	2.95	3.45*	3.70*	4.22*	5.81*	7.49*	
200	5	0.79	0.88	1.08	1.17	1.27	1.36	1.56*	1.65*	1.84*	2.39*	2.90*	
	10	0.95	1.06	1.28	1.40	1.51	1.61	1.85*	1.97*	2.19*	2.85*	3.48*	
	20	1.15	1.28	1.56	1.70	1.83	1.96	2.25*	2.40*	2.68*	3.52*	4.33*	
	30	1.30	1.45	1.76	1.92	2.07	2.22	2.56*	2.73*	3.06*	4.04*	5.01*	
	40	1.42	1.58	1.93	2.11	2.28	2.44	2.82*	3.01*	3.39*	4.50*	5.62*	
	60	1.62	1.81	2.21	2.42	2.62	2.82	3.27*	3.50*	3.95*	5.32*	6.72*	
	70	1.70	1.90	2.34	2.55	2.77	2.99	3.47*	3.71*	4.20*	5.69*	7.24*	
	80	1.78	1.99	2.45	2.68	2.91	3.14	3.66*	3.92*	4.45*	6.06*	7.74*	
250	5	0.84	0.93	1.13	1.23	1.33	1.42	1.63*	1.73*	1.93*	2.49*	3.03*	
	10	1.00	1.12	1.36	1.47	1.59	1.70	1.94*	2.07*	2.30*	2.99*	3.64*	
	20	1.22	1.36	1.65	1.79	1.93	2.07	2.37*	2.52*	2.82*	3.68*	4.52*	
	30	1.38	1.54	1.87	2.03	2.19	2.35	2.70*	2.87*	3.22*	4.23*	5.22*	
	40	1.51	1.69	2.05	2.23	2.41	2.58	2.97*	3.17*	3.56*	4.70*	5.85*	
	60	1.73	1.93	2.35	2.56	2.77	2.98	3.44*	3.67*	4.14*	5.54*	6.96*	
	70	1.82	2.03	2.48	2.70	2.93	3.15	3.65*	3.90*	4.40*	5.92*	7.47*	
	80	1.90	2.13	2.60	2.84	3.08	3.31	3.84*	4.11*	4.65*	6.28*	7.97*	
300	5	0.88	0.97	1.18	1.29	1.38	1.48	1.69*	1.80*	2.00*	2.59*	3.14*	
	10	1.05	1.17	1.42	1.54	1.66	1.77	2.03*	2.15*	2.40*	3.11*	3.78*	
	20	1.29	1.43	1.73	1.88	2.02	2.16	2.48*	2.64*	2.95*	3.84*	4.69*	
	30	1.46	1.62	1.96	2.13	2.30	2.46	2.82*	3.00*	3.36*	4.40*	5.42*	
	40	1.60	1.78	2.15	2.34	2.52	2.70	3.11*	3.31*	3.71*	4.89*	6.05*	
	60	1.82	2.03	2.47	2.69	2.90	3.11	3.59*	3.83*	4.31*	5.74*	7.18*	
	70	1.92	2.14	2.61	2.84	3.07	3.29	3.81*	4.07*	4.58*	6.12*	7.69*	
	80	2.01	2.24	2.73	2.98	3.22	3.46	4.01*	4.28*	4.83*	6.49*	8.19*	
400	5	0.94	1.05	1.27	1.37	1.48	1.58	1.81*	1.92*	2.14*	2.75*	3.33*	
	10	1.14	1.26	1.53	1.66	1.78	1.90	2.17*	2.31*	2.57*	3.32*	4.02*	
	20	1.40	1.55	1.87	2.03	2.18	2.33	2.67*	2.83*	3.16*	4.10*	5.00*	
	30	1.59	1.76	2.13	2.30	2.48	2.65	3.04*	3.23*	3.61*	4.70*	5.76*	
	40	1.74	1.93	2.34	2.53	2.72	2.91	3.34*	3.56*	3.98*	5.21*	6.42*	
	60	1.99	2.21	2.68	2.91	3.13	3.36	3.86*	4.12*	4.62*	6.10*	7.57*	
	70	2.10	2.33	2.83	3.07	3.31	3.55	4.09*	4.36*	4.90*	6.50*	8.10*	
	80	2.19	2.44	2.96	3.22	3.48	3.73	4.30*	4.59*	5.16*	6.87*	8.60*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.0 m (RADIUS = 2.1 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s)^{1/2}

°C

1

2

4

5

6

7

9

10

12

18

24

0

5

0.48

0.58

0.79

0.90

1.01

1.12

1.35*

1.46*

1.68*

2.35*

3.02*

10

0.54

0.68

0.96

1.10

1.24

1.39

1.68*

1.82*

2.12*

3.03*

3.96*

20

0.66

0.85

1.23

1.43

1.63

1.83

2.24*

2.44*

2.87*

4.17*

5.53*

30

0.76

1.00

1.47

1.72

1.96

2.22

2.73*

2.99*

3.52*

5.17*

6.90*

40

0.86

1.13

1.69

1.98

2.27

2.57

3.18*

3.49*

4.12*

6.09*

8.17*

60

1.03

1.38

2.10

2.47

2.84

3.22

4.00*

4.40*

5.22*

7.78*

10.48*

70

1.11

1.50

2.29

2.69

3.11

3.53

4.39*

4.83*

5.73*

8.56*

11.56*

80

1.19

1.61

2.47

2.91

3.36

3.82

4.76*

5.24*

6.22*

9.32*

12.61*

10

5

0.65

0.74

0.94

1.05

1.15

1.25

1.47*

1.58*

1.80*

2.46*

3.13*

10

0.74

0.85

1.10

1.24

1.37

1.50

1.79*

1.93*

2.22*

3.12*

4.05*

20

0.87

1.02

1.37

1.55

1.74

1.93

2.33*

2.54*

2.95*

4.25*

5.60*

30

0.98

1.17

1.60

1.83

2.06

2.31

2.81*

3.07*

3.60*

5.24*

6.97*

40

1.07

1.30

1.81

2.08

2.37

2.66

3.26*

3.56*

4.19*

6.16*

8.23*

60

1.24

1.53

2.20

2.56

2.92

3.30

4.07*

4.47*

5.28*

7.84*

10.54*

70

1.32

1.65

2.39

2.78

3.19

3.60

4.46*

4.89*

5.79*

8.62*

11.62*

80

1.39

1.75

2.57

3.00

3.44

3.89

4.83*

5.30*

6.29*

9.38*

12.66*

20

5

0.72

0.82

1.03

1.14

1.24

1.35

1.57*

1.68*

1.90*

2.56*

3.23*

10

0.83

0.95

1.21

1.34

1.47

1.60

1.89*

2.03*

2.32*

3.21*

4.13*

20

0.99

1.14

1.48

1.66

1.84

2.02

2.42*

2.62*

3.04*

4.33*

5.67*

30

1.11

1.29

1.71

1.93

2.16

2.39

2.89*

3.15*

3.67*

5.31*

7.04*

40

1.22

1.43

1.92

2.18

2.46

2.74

3.33*

3.64*

4.26*

6.22*

8.29*

60

1.39

1.67

2.30

2.65

3.01

3.37

4.14*

4.54*

5.35*

7.90*

10.59*

70

1.47

1.78

2.49

2.87

3.26

3.67

4.52*

4.96*

5.86*

8.68*

11.67*

80

1.55

1.89

2.66

3.08

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.0 m (RADIUS = 2.1 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °C	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
150 (m*s) ^{1/2}	5	1.08	1.21	1.48	1.62	1.75	1.87	2.15*	2.29*	2.56*	3.34*	4.09*
	10	1.30	1.46	1.78	1.94	2.10	2.25	2.60*	2.77*	3.10*	4.08*	5.05*
	20	1.59	1.78	2.19	2.39	2.59	2.79	3.23*	3.45*	3.90*	5.22*	6.56*
	30	1.81	2.03	2.50	2.74	2.98	3.21	3.74*	4.01*	4.54*	6.17*	7.87*
	40	1.98	2.23	2.77	3.04	3.31	3.58	4.19*	4.50*	5.12*	7.05*	9.07*
	60	2.27	2.57	3.21	3.55	3.88	4.22	4.98*	5.37*	6.16*	8.66*	11.31*
	70	2.40	2.72	3.41	3.77	4.14	4.52	5.35*	5.78*	6.65*	9.41*	12.36*
	80	2.51	2.86	3.60	3.99	4.39	4.80	5.70*	6.17*	7.12*	10.15*	13.38*
200	5	1.16	1.30	1.58	1.72	1.86	1.99	2.28*	2.43*	2.71*	3.53*	4.30*
	10	1.41	1.57	1.91	2.08	2.24	2.40	2.76*	2.94*	3.29*	4.31*	5.31*
	20	1.72	1.93	2.35	2.56	2.77	2.98	3.44*	3.67*	4.13*	5.49*	6.85*
	30	1.96	2.19	2.69	2.94	3.18	3.43	3.97*	4.25*	4.80*	6.46*	8.16*
	40	2.15	2.41	2.97	3.25	3.53	3.81	4.43*	4.75*	5.39*	7.33*	9.36*
	60	2.47	2.78	3.45	3.79	4.13	4.47	5.25*	5.64*	6.44*	8.94*	11.58*
	70	2.60	2.94	3.66	4.02	4.40	4.77	5.62*	6.05*	6.93*	9.69*	12.62*
	80	2.73	3.09	3.86	4.25	4.65	5.06	5.97*	6.44*	7.40*	10.41*	13.63*
250	5	1.23	1.37	1.67	1.81	1.95	2.09	2.40*	2.55*	2.84*	3.69*	4.49*
	10	1.49	1.66	2.02	2.19	2.36	2.53	2.91*	3.09*	3.46*	4.51*	5.54*
	20	1.84	2.05	2.49	2.71	2.93	3.14	3.62*	3.86*	4.33*	5.73*	7.12*
	30	2.09	2.33	2.85	3.11	3.36	3.61	4.18*	4.46*	5.02*	6.72*	8.44*
	40	2.30	2.57	3.15	3.44	3.72	4.01	4.65*	4.98*	5.63*	7.60*	9.64*
	60	2.64	2.96	3.65	4.00	4.35	4.70	5.49*	5.89*	6.70*	9.20*	11.84*
	70	2.78	3.13	3.87	4.25	4.62	5.01	5.86*	6.30*	7.19*	9.95*	12.88*
	80	2.91	3.28	4.08	4.48	4.89	5.30	6.22*	6.70*	7.66*	10.68*	13.88*
300	5	1.29	1.43	1.74	1.89	2.04	2.18	2.50*	2.65*	2.96*	3.83*	4.66*
	10	1.57	1.74	2.11	2.30	2.47	2.65	3.03*	3.23*	3.60*	4.69*	5.75*
	20	1.94	2.16	2.62	2.84	3.07	3.29	3.78*	4.03*	4.52*	5.95*	7.36*
	30	2.21	2.46	2.99	3.26	3.52	3.78	4.36*	4.65*	5.23*	6.96*	8.70*
	40	2.42	2.71	3.31	3.60	3.90	4.19	4.85*	5.19*	5.85*	7.85*	9.90*
	60	2.78	3.12	3.83	4.19	4.54	4.90	5.70*	6.11*	6.94*	9.46*	12.10*
	70	2.94	3.30	4.06	4.44	4.83	5.22	6.09*	6.54*	7.43*	10.21*	13.13*
	80	3.08	3.46	4.27	4.68	5.10	5.52	6.46*	6.94*	7.91*	10.93*	14.13*
400	5	1.39	1.55	1.87	2.03	2.18	2.33	2.67*	2.83*	3.16*	4.08*	4.95*
	10	1.70	1.89	2.28	2.47	2.66	2.84	3.25*	3.46*	3.86*	5.01*	6.11*
	20	2.11	2.34	2.83	3.07	3.31	3.54	4.06*	4.32*	4.84*	6.33*	7.80*
	30	2.40	2.67	3.24	3.52	3.79	4.06	4.68*	4.98*	5.59*	7.39*	9.17*
	40	2.65	2.95	3.58	3.89	4.20	4.51	5.20*	5.55*	6.24*	8.31*	10.39*
	60	3.04	3.40	4.14	4.52	4.89	5.26	6.09*	6.52*	7.37*	9.94*	12.60*
	70	3.21	3.59	4.39	4.79	5.19	5.59	6.49*	6.95*	7.88*	10.69*	13.62*
	80	3.36	3.77	4.62	5.05	5.47	5.90	6.87*	7.37*	8.36*	11.41*	14.62*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.0 m (RADIUS = 2.1 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE	CEILING HEIGHT, m											
			1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	°C													
	5	0.70	0.86	1.21	1.39	1.57	1.75	2.11*	2.29*	2.66*	3.78*	4.92*		
	10	0.84	1.06	1.54	1.78	2.02	2.27	2.77*	3.03*	3.54*	5.13*	6.79*		
	20	1.07	1.40	2.09	2.44	2.79	3.15	3.89*	4.27*	5.03*	7.42*	9.93*		
	30	1.27	1.70	2.57	3.01	3.47	3.93	4.87*	5.35*	6.34*	9.42*	12.68*		
	40	1.46	1.97	3.01	3.54	4.08	4.64	5.77*	6.35*	7.54*	11.26*	15.21*		
	60	1.81	2.47	3.82	4.51	5.22	5.94	7.42*	8.18*	9.73*	14.63*	19.84*		
	70	1.97	2.71	4.20	4.96	5.75	6.55	8.19*	9.03*	10.76*	16.21*	22.00*		
10	80	2.12	2.93	4.56	5.40	6.26	7.13	8.93*	9.86*	11.75*	17.72*	24.09*		
	5	0.93	1.07	1.39	1.55	1.72	1.88	2.24*	2.42*	2.78*	3.89*	5.03*		
	10	1.09	1.27	1.70	1.92	2.15	2.39	2.88*	3.13*	3.64*	5.23*	6.88*		
	20	1.33	1.60	2.22	2.56	2.90	3.25	3.98*	4.36*	5.12*	7.50*	10.00*		
	30	1.52	1.88	2.69	3.12	3.57	4.02	4.96*	5.44*	6.42*	9.49*	12.75*		
	40	1.70	2.14	3.13	3.64	4.18	4.72	5.85*	6.43*	7.61*	11.33*	15.27*		
	60	2.03	2.63	3.92	4.60	5.30	6.02	7.49*	8.25*	9.80*	14.69*	19.89*		
	70	2.18	2.85	4.30	5.05	5.83	6.62	8.26*	9.10*	10.82*	16.26*	22.06*		
20	80	2.33	3.08	4.66	5.49	6.34	7.21	9.00*	9.92*	11.81*	17.78*	24.14*		
	5	1.04	1.19	1.51	1.67	1.84	2.00	2.36*	2.54*	2.89*	4.00*	5.13*		
	10	1.23	1.41	1.83	2.05	2.27	2.50	2.99*	3.24*	3.75*	5.32*	6.96*		
	20	1.49	1.76	2.35	2.68	3.01	3.35	4.08*	4.45*	5.20*	7.58*	10.08*		
	30	1.71	2.04	2.81	3.23	3.66	4.11	5.04*	5.52*	6.49*	9.56*	12.81*		
	40	1.89	2.30	3.24	3.75	4.27	4.81	5.93*	6.50*	7.68*	11.39*	15.33*		
	60	2.23	2.78	4.03	4.70	5.39	6.09	7.56*	8.32*	9.86*	14.75*	19.95*		
	70	2.38	3.00	4.40	5.14	5.91	6.69	8.33*	9.17*	10.89*	16.32*	22.11*		
50	80	2.53	3.22	4.76	5.57	6.41	7.28	9.07*	9.99*	11.87*	17.84*	24.19*		
	5	1.24	1.40	1.75	1.92	2.09	2.27	2.64*	2.82*	3.19*	4.30*	5.43*		
	10	1.48	1.68	2.12	2.34	2.57	2.79	3.28*	3.53*	4.04*	5.59*	7.22*		
	20	1.82	2.08	2.68	2.99	3.31	3.64	4.35*	4.71*	5.46*	7.81*	10.29*		
	30	2.07	2.40	3.14	3.54	3.95	4.37	5.29*	5.76*	6.73*	9.78*	13.01*		
	40	2.29	2.68	3.56	4.04	4.54	5.06	6.16*	6.73*	7.90*	11.59*	15.52*		
	60	2.66	3.17	4.33	4.97	5.63	6.32	7.77*	8.52*	10.06*	14.93*	20.12*		
	70	2.83	3.39	4.69	5.40	6.15	6.91	8.53*	9.37*	11.08*	16.49*	22.27*		
100	80	2.98	3.60	5.04	5.83	6.65	7.49	9.26*	10.18*	12.06*	18.00*	24.35*		
	5	1.45	1.63	2.00	2.19	2.38	2.56	2.96*	3.16*	3.55*	4.71*	5.86*		
	10	1.75	1.97	2.44	2.68	2.91	3.15	3.66*	3.92*	4.44*	6.01*	7.63*		
	20	2.16	2.45	3.07	3.38	3.71	4.03	4.75*	5.12*	5.86*	8.19*	10.65*		
	30	2.46	2.81	3.56	3.96	4.36	4.77	5.68*	6.15*	7.11*	10.13*	13.34*		
	40	2.72	3.12	4.00	4.47	4.95	5.45	6.54*	7.10*	8.26*	11.92*	15.82*		
	60	3.15	3.65	4.78	5.39	6.03	6.69	8.12*	8.86*	10.39*	15.23*	20.39*		
	70	3.34	3.89	5.14	5.82	6.53	7.27	8.87*	9.69*	11.39*	16.78*	22.54*		
80	3.51	4.12	5.49	6.24	7.02	7.84	9.59*	10.50*	12.36*	18.28*	24.61*			

SPACING = 3.0 m
 FIRE GROWTH: MEDIUM (RADIUS = 2.1 m)
 (ALPHA = .0117 kJ/s³)

RESPONSE TEMPERATURE
 TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	1.60	1.79	2.19	2.39	2.59	2.78	3.20*	3.41*	3.82*	5.03*	6.22*
	10	1.94	2.18	2.68	2.93	3.17	3.42	3.96*	4.23*	4.77*	6.38*	8.02*
	20	2.41	2.71	3.36	3.69	4.02	4.35	5.09*	5.47*	6.22*	8.56*	11.01*
	30	2.75	3.11	3.90	4.30	4.70	5.12	6.03*	6.51*	7.46*	10.47*	13.66*
	40	3.04	3.45	4.36	4.83	5.31	5.80	6.89*	7.45*	8.60*	12.24*	16.13*
	60	3.51	4.03	5.16	5.77	6.39	7.04	8.46*	9.20*	10.71*	15.52*	20.67*
	70	3.72	4.28	5.53	6.20	6.89	7.62	9.20*	10.02*	11.70*	17.06*	22.80*
	80	3.91	4.52	5.88	6.62	7.38	8.18	9.91*	10.81*	12.66*	18.56*	24.87*
200	5	1.72	1.92	2.34	2.55	2.75	2.96	3.40*	3.62*	4.05*	5.31*	6.53*
	10	2.10	2.35	2.87	3.13	3.39	3.64	4.20*	4.48*	5.04*	6.70*	8.36*
	20	2.61	2.93	3.61	3.95	4.29	4.63	5.38*	5.77*	6.54*	8.90*	11.35*
	30	2.98	3.36	4.17	4.58	5.00	5.42	6.35*	6.83*	7.79*	10.80*	13.98*
	40	3.29	3.73	4.66	5.13	5.62	6.11	7.22*	7.78*	8.93*	12.56*	16.43*
	60	3.81	4.34	5.50	6.10	6.72	7.36	8.78*	9.52*	11.02*	15.81*	20.95*
	70	4.03	4.61	5.87	6.54	7.23	7.94	9.52*	10.33*	12.01*	17.35*	23.07*
	80	4.24	4.86	6.23	6.96	7.72	8.50	10.22*	11.12*	12.96*	18.83*	25.12*
250	5	1.82	2.03	2.47	2.69	2.90	3.11	3.57*	3.80*	4.25*	5.55*	6.80*
	10	2.23	2.49	3.04	3.31	3.57	3.83	4.42*	4.71*	5.29*	6.99*	8.68*
	20	2.78	3.11	3.82	4.17	4.52	4.87	5.65*	6.04*	6.83*	9.22*	11.68*
	30	3.18	3.58	4.41	4.83	5.26	5.68	6.64*	7.12*	8.10*	11.12*	14.30*
	40	3.51	3.96	4.92	5.41	5.90	6.40	7.51*	8.09*	9.24*	12.87*	16.73*
	60	4.06	4.61	5.79	6.40	7.02	7.66	9.09*	9.83*	11.33*	16.11*	21.22*
	70	4.30	4.89	6.18	6.85	7.54	8.24	9.82*	10.64*	12.31*	17.63*	23.33*
	80	4.52	5.16	6.54	7.27	8.03	8.80	10.53*	11.42*	13.26*	19.10*	25.38*
300	5	1.91	2.13	2.59	2.81	3.03	3.24	3.72*	3.96*	4.42*	5.76*	7.05*
	10	2.35	2.62	3.18	3.46	3.74	4.01	4.61*	4.91*	5.50*	7.25*	8.97*
	20	2.93	3.28	4.00	4.36	4.72	5.08	5.88*	6.29*	7.09*	9.51*	11.99*
	30	3.36	3.77	4.63	5.06	5.49	5.92	6.90*	7.39*	8.38*	11.43*	14.61*
	40	3.71	4.17	5.15	5.65	6.15	6.66	7.79*	8.37*	9.54*	13.17*	17.02*
	60	4.29	4.85	6.05	6.67	7.30	7.94	9.38*	10.12*	11.63*	16.39*	21.49*
	70	4.54	5.14	6.45	7.13	7.82	8.53	10.11*	10.93*	12.60*	17.91*	23.60*
	80	4.77	5.42	6.83	7.56	8.32	9.09	10.82*	11.71*	13.54*	19.37*	25.63*
400	5	2.07	2.30	2.79	3.02	3.25	3.48	3.98*	4.23*	4.72*	6.13*	7.48*
	10	2.56	2.84	3.44	3.73	4.02	4.31	4.94*	5.26*	5.89*	7.71*	9.49*
	20	3.20	3.56	4.33	4.71	5.08	5.46	6.30*	6.72*	7.56*	10.05*	12.57*
	30	3.66	4.09	5.00	5.45	5.90	6.35	7.36*	7.87*	8.90*	12.00*	15.20*
	40	4.05	4.54	5.56	6.08	6.60	7.12	8.28*	8.88*	10.08*	13.75*	17.60*
	60	4.68	5.27	6.52	7.15	7.79	8.44	9.91*	10.66*	12.18*	16.95*	22.03*
	70	4.95	5.58	6.94	7.63	8.33	9.05	10.65*	11.48*	13.16*	18.45*	24.12*
	80	5.20	5.88	7.33	8.08	8.84	9.62	11.36*	12.26*	14.10*	19.91*	26.14*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.0 m (RADIUS = 2.1 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	°C												
	5	1.06	1.34	1.92	2.22	2.52	2.83	3.44*	3.76*	4.39*	6.34*	8.36*	
	10	1.34	1.74	2.58	3.00	3.44	3.88	4.77*	5.23*	6.16*	9.06*	12.09*	
	20	1.80	2.42	3.67	4.32	4.97	5.64	7.01*	7.71*	9.14*	13.63*	18.37*	
	30	2.21	3.01	4.64	5.47	6.32	7.19	8.97*	9.88*	11.75*	17.63*	23.88*	
	40	2.59	3.56	5.52	6.53	7.56	8.61	10.77*	11.88*	14.15*	21.31*	28.93*	
	60	3.28	4.56	7.14	8.47	9.83	11.21	14.07*	15.54*	18.54*	28.05*	38.19*	
	70	3.60	5.03	7.89	9.37	10.89	12.43	15.61*	17.24*	20.59*	31.20*	42.52*	
10	80	3.91	5.48	8.62	10.25	11.91	13.60	17.10*	18.89*	22.57*	34.24*	46.69*	
	5	1.36	1.59	2.11	2.39	2.68	2.97	3.58*	3.88*	4.51*	6.45*	8.46*	
	10	1.64	1.97	2.74	3.15	3.57	4.00	4.89*	5.34*	6.26*	9.15*	12.18*	
	20	2.09	2.62	3.81	4.44	5.08	5.74	7.10*	7.80*	9.23*	13.70*	18.45*	
	30	2.48	3.20	4.76	5.58	6.42	7.28	9.06*	9.97*	11.83*	17.70*	23.94*	
	40	2.84	3.73	5.64	6.63	7.65	8.70	10.85*	11.96*	14.22*	21.38*	28.99*	
	60	3.50	4.71	7.24	8.56	9.91	11.29	14.14*	15.61*	18.61*	28.11*	38.25*	
	70	3.82	5.18	8.00	9.46	10.97	12.50	15.68*	17.31*	20.66*	31.26*	42.57*	
20	80	4.12	5.62	8.72	10.33	11.99	13.68	17.16*	18.96*	22.63*	34.29*	46.74*	
	5	1.52	1.75	2.27	2.54	2.82	3.10	3.70*	4.01*	4.63*	6.56*	8.57*	
	10	1.84	2.16	2.89	3.29	3.70	4.11	5.00*	5.45*	6.37*	9.24*	12.27*	
	20	2.32	2.81	3.95	4.56	5.19	5.84	7.20*	7.89*	9.31*	13.78*	18.52*	
	30	2.71	3.38	4.88	5.69	6.52	7.37	9.14*	10.05*	11.91*	17.77*	24.01*	
	40	3.07	3.90	5.75	6.73	7.74	8.78	10.93*	12.03*	14.29*	21.44*	29.06*	
	60	3.72	4.87	7.35	8.65	9.99	11.37	14.21*	15.68*	18.67*	28.17*	38.30*	
	70	4.03	5.32	8.10	9.55	11.05	12.58	15.75*	17.38*	20.72*	31.31*	42.63*	
50	80	4.33	5.77	8.82	10.42	12.06	13.75	17.23*	19.02*	22.70*	34.35*	46.80*	
	5	1.83	2.08	2.62	2.89	3.17	3.45	4.05*	4.36*	4.98*	6.88*	8.87*	
	10	2.22	2.55	3.28	3.66	4.05	4.45	5.32*	5.76*	6.67*	9.52*	12.53*	
	20	2.79	3.26	4.33	4.91	5.51	6.14	7.47*	8.16*	9.57*	14.02*	18.74*	
	30	3.23	3.84	5.25	6.01	6.81	7.64	9.39*	10.29*	12.14*	17.99*	24.21*	
	40	3.61	4.36	6.09	7.04	8.02	9.03	11.16*	12.26*	14.51*	21.64*	29.24*	
	60	4.29	5.31	7.66	8.93	10.24	11.60	14.43*	15.88*	18.87*	28.35*	38.47*	
	70	4.60	5.75	8.40	9.82	11.29	12.80	15.95*	17.58*	20.91*	31.49*	42.79*	
100	80	4.90	6.19	9.11	10.68	12.30	13.96	17.43*	19.22*	22.88*	34.52*	46.95*	
	5	2.15	2.42	3.00	3.29	3.58	3.87	4.50*	4.82*	5.46*	7.38*	9.36*	
	10	2.63	2.98	3.74	4.13	4.52	4.92	5.80*	6.24*	7.15*	9.97*	12.95*	
	20	3.30	3.78	4.86	5.42	6.00	6.61	7.92*	8.60*	10.00*	14.41*	19.10*	
	30	3.81	4.42	5.78	6.52	7.28	8.08	9.81*	10.70*	12.53*	18.34*	24.54*	
	40	4.24	4.97	6.62	7.52	8.47	9.45	11.55*	12.64*	14.88*	21.97*	29.55*	
	60	4.99	5.95	8.16	9.38	10.65	11.97	14.78*	16.23*	19.20*	28.65*	38.75*	
	70	5.32	6.39	8.89	10.25	11.68	13.16	16.29*	17.91*	21.23*	31.77*	43.05*	
80	5.63	6.82	9.59	11.10	12.68	14.31	17.76*	19.54*	23.19*	34.79*	47.21*		

SPACING = 3.0 m (RADIUS = 2.1 m)
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 (m*s) ^{1/2}	°C												
	5	2.38	2.66	3.28	3.59	3.89	4.19	4.85*	5.18*	5.84*	7.82*	9.82*	
	10	2.93	3.30	4.09	4.49	4.90	5.30	6.20*	6.66*	7.58*	10.41*	13.37*	
	20	3.67	4.18	5.28	5.85	6.43	7.03	8.34*	9.02*	10.41*	14.79*	19.46*	
	30	4.24	4.86	6.24	6.96	7.72	8.50	10.21*	11.09*	12.91*	18.69*	24.87*	
	40	4.72	5.45	7.09	7.97	8.89	9.85	11.93*	13.01*	15.24*	22.30*	29.86*	
	60	5.52	6.47	8.63	9.82	11.06	12.35	15.13*	16.57*	19.53*	28.95*	39.03*	
	70	5.87	6.93	9.35	10.68	12.07	13.52	16.63*	18.24*	21.54*	32.06*	43.32*	
	80	6.21	7.37	10.05	11.52	13.06	14.66	18.09*	19.86*	23.49*	35.07*	47.47*	
200	5	2.56	2.86	3.51	3.83	4.14	4.46	5.15*	5.49*	6.17*	8.20*	10.23*	
	10	3.17	3.55	4.38	4.80	5.21	5.63	6.55*	7.02*	7.96*	10.81*	13.78*	
	20	3.98	4.50	5.63	6.21	6.80	7.40	8.73*	9.41*	10.80*	15.17*	19.82*	
	30	4.59	5.23	6.63	7.36	8.11	8.88	10.59*	11.48*	13.29*	19.04*	25.19*	
	40	5.10	5.85	7.51	8.38	9.29	10.23	12.31*	13.38*	15.59*	22.63*	30.16*	
	60	5.96	6.92	9.07	10.23	11.44	12.71	15.47*	16.91*	19.85*	29.24*	39.30*	
	70	6.34	7.40	9.79	11.09	12.45	13.88	16.96*	18.57*	21.86*	32.35*	43.59*	
	80	6.69	7.85	10.48	11.92	13.43	15.01	18.41*	20.17*	23.80*	35.35*	47.73*	
250	5	2.72	3.04	3.71	4.04	4.36	4.69	5.40*	5.76*	6.46*	8.54*	10.61*	
	10	3.37	3.77	4.63	5.06	5.49	5.91	6.86*	7.34*	8.30*	11.19*	14.17*	
	20	4.24	4.79	5.95	6.54	7.13	7.74	9.08*	9.77*	11.17*	15.54*	20.18*	
	30	4.90	5.55	6.98	7.72	8.47	9.24	10.96*	11.84*	13.65*	19.38*	25.52*	
	40	5.44	6.21	7.88	8.76	9.66	10.60	12.67*	13.74*	15.94*	22.95*	30.46*	
	60	6.35	7.31	9.46	10.62	11.82	13.07	15.81*	17.24*	20.18*	29.54*	39.58*	
	70	6.74	7.81	10.19	11.48	12.82	14.23	17.30*	18.89*	22.17*	32.63*	43.86*	
	80	7.11	8.27	10.89	12.31	13.80	15.35	18.73*	20.49*	24.10*	35.62*	47.99*	
300	5	2.86	3.19	3.88	4.22	4.56	4.89	5.63*	6.00*	6.72*	8.85*	10.95*	
	10	3.55	3.97	4.86	5.30	5.73	6.17	7.14*	7.63*	8.61*	11.55*	14.54*	
	20	4.48	5.03	6.22	6.83	7.43	8.04	9.41*	10.11*	11.52*	15.90*	20.53*	
	30	5.16	5.84	7.29	8.04	8.80	9.57	11.30*	12.19*	14.00*	19.73*	25.84*	
	40	5.74	6.52	8.22	9.10	10.01	10.94	13.01*	14.09*	16.28*	23.27*	30.77*	
	60	6.69	7.67	9.83	10.98	12.17	13.41	16.15*	17.57*	20.50*	29.83*	39.85*	
	70	7.10	8.18	10.57	11.85	13.18	14.57	17.62*	19.21*	22.48*	32.92*	44.12*	
	80	7.49	8.66	11.27	12.68	14.15	15.69	19.05*	20.80*	24.40*	35.90*	48.24*	
400	5	3.10	3.45	4.19	4.55	4.90	5.25	6.02*	6.41*	7.18*	9.40*	11.57*	
	10	3.86	4.31	5.24	5.71	6.16	6.62	7.63*	8.15*	9.16*	12.19*	15.24*	
	20	4.88	5.47	6.71	7.34	7.96	8.59	10.00*	10.72*	12.16*	16.58*	21.21*	
	30	5.63	6.34	7.84	8.61	9.39	10.17	11.93*	12.83*	14.67*	20.39*	26.48*	
	40	6.25	7.07	8.82	9.71	10.63	11.57	13.66*	14.74*	16.94*	23.91*	31.37*	
	60	7.28	8.29	10.49	11.65	12.83	14.06	16.79*	18.21*	21.13*	30.42*	40.40*	
	70	7.73	8.83	11.25	12.52	13.85	15.22	18.26*	19.84*	23.09*	33.48*	44.65*	
	80	8.14	9.34	11.97	13.36	14.82	16.33	19.68*	21.42*	25.00*	36.45*	48.76*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.5 m (RADIUS = 2.5 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE		CEILING HEIGHT, m											
(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24			
0	5	0.37	0.44	0.57	0.64	0.72	0.79	0.93*	1.00*	1.14*	1.55*	1.97*			
	10	0.41	0.49	0.66	0.75	0.84	0.92	1.10*	1.19*	1.37*	1.90*	2.45*			
	20	0.48	0.58	0.81	0.92	1.04	1.16	1.39*	1.51*	1.75*	2.49*	3.25*			
	30	0.54	0.67	0.94	1.08	1.22	1.36	1.65*	1.80*	2.09*	3.00*	3.95*			
	40	0.59	0.74	1.06	1.22	1.38	1.55	1.89*	2.06*	2.40*	3.48*	4.60*			
	60	0.69	0.88	1.28	1.48	1.68	1.89	2.32*	2.53*	2.97*	4.34*	5.78*			
	70	0.73	0.95	1.38	1.60	1.82	2.05	2.52*	2.76*	3.24*	4.75*	6.33*			
	80	0.78	1.01	1.48	1.72	1.96	2.21	2.71*	2.97*	3.50*	5.14*	6.87*			
10	5	0.51	0.56	0.70	0.77	0.83	0.90	1.04*	1.11*	1.25*	1.66*	2.07*			
	10	0.57	0.64	0.79	0.87	0.96	1.04	1.21*	1.29*	1.47*	2.00*	2.53*			
	20	0.66	0.74	0.94	1.04	1.15	1.26	1.48*	1.60*	1.84*	2.57*	3.32*			
	30	0.72	0.83	1.06	1.19	1.32	1.46	1.73*	1.88*	2.17*	3.08*	4.02*			
	40	0.78	0.90	1.18	1.33	1.48	1.64	1.96*	2.13*	2.48*	3.54*	4.66*			
	60	0.88	1.03	1.39	1.58	1.77	1.97	2.39*	2.60*	3.04*	4.40*	5.84*			
	70	0.93	1.09	1.48	1.69	1.91	2.13	2.59*	2.82*	3.30*	4.80*	6.39*			
	80	0.97	1.15	1.58	1.81	2.04	2.28	2.78*	3.03*	3.56*	5.19*	6.92*			
20	5	0.56	0.62	0.76	0.83	0.90	0.97	1.11*	1.19*	1.33*	1.75*	2.16*			
	10	0.64	0.71	0.87	0.95	1.04	1.12	1.29*	1.38*	1.55*	2.08*	2.62*			
	20	0.74	0.83	1.03	1.14	1.24	1.35	1.57*	1.69*	1.92*	2.64*	3.39*			
	30	0.82	0.92	1.16	1.29	1.41	1.54	1.81*	1.96*	2.25*	3.15*	4.08*			
	40	0.89	1.01	1.28	1.42	1.57	1.72	2.04*	2.21*	2.55*	3.61*	4.72*			
	60	1.00	1.15	1.49	1.67	1.86	2.05	2.46*	2.67*	3.10*	4.46*	5.89*			
	70	1.05	1.21	1.58	1.78	1.99	2.21	2.65*	2.89*	3.37*	4.86*	6.44*			
	80	1.10	1.27	1.68	1.89	2.12	2.36	2.84*	3.10*	3.62*	5.25*	6.97*			
50	5	0.65	0.72	0.88	0.95	1.03	1.10	1.25*	1.33*	1.49*	1.94*	2.37*			
	10	0.76	0.84	1.02	1.11	1.20	1.28	1.46*	1.56*	1.75*	2.30*	2.84*			
	20	0.90	0.99	1.21	1.32	1.43	1.54	1.77*	1.89*	2.13*	2.86*	3.60*			
	30	1.00	1.11	1.36	1.49	1.62	1.75	2.02*	2.17*	2.46*	3.35*	4.28*			
	40	1.09	1.21	1.49	1.64	1.79	1.94	2.25*	2.42*	2.75*	3.80*	4.90*			
	60	1.23	1.38	1.72	1.90	2.08	2.27	2.66*	2.87*	3.30*	4.64*	6.06*			
	70	1.29	1.45	1.82	2.02	2.21	2.42	2.85*	3.08*	3.55*	5.03*	6.60*			
	80	1.35	1.52	1.92	2.13	2.34	2.57	3.04*	3.29*	3.80*	5.41*	7.12*			
100	5	0.75	0.82	0.99	1.08	1.16	1.24	1.41*	1.49*	1.66*	2.15*	2.62*			
	10	0.88	0.97	1.17	1.27	1.36	1.46	1.65*	1.76*	1.96*	2.55*	3.13*			
	20	1.06	1.17	1.41	1.53	1.64	1.76	2.00*	2.13*	2.39*	3.15*	3.91*			
	30	1.19	1.31	1.59	1.72	1.86	2.00	2.28*	2.43*	2.74*	3.65*	4.58*			
	40	1.29	1.43	1.74	1.89	2.05	2.20	2.52*	2.69*	3.04*	4.10*	5.20*			
	60	1.47	1.63	1.99	2.18	2.36	2.55	2.94*	3.16*	3.59*	4.92*	6.33*			
	70	1.54	1.72	2.10	2.30	2.51	2.71	3.14*	3.37*	3.84*	5.31*	6.86*			
	80	1.61	1.80	2.21	2.42	2.64	2.86	3.32*	3.57*	4.08*	5.68*	7.38*			

SPACING = 3.5 m (RADIUS = 2.5 m)
FIRE GROWTH: ULTRAFAST ($\alpha = 0.1875 \text{ kJ/s}^3$)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 (m*s) ^{1/2}	°C												
	5	0.82	0.90	1.08	1.17	1.26	1.34	1.51*	1.61*	1.79*	2.30*	2.80*	
	10	0.97	1.07	1.28	1.38	1.49	1.59	1.79*	1.90*	2.12*	2.75*	3.35*	
	20	1.18	1.29	1.55	1.67	1.80	1.92	2.18*	2.32*	2.59*	3.39*	4.17*	
	30	1.32	1.46	1.75	1.89	2.04	2.18	2.48*	2.64*	2.96*	3.90*	4.85*	
	40	1.44	1.59	1.92	2.08	2.24	2.40	2.73*	2.92*	3.28*	4.36*	5.47*	
	60	1.64	1.82	2.20	2.39	2.58	2.78	3.18*	3.40*	3.84*	5.19*	6.59*	
	70	1.73	1.91	2.32	2.53	2.73	2.94	3.38*	3.62*	4.10*	5.57*	7.12*	
200	80	1.81	2.00	2.43	2.65	2.88	3.10	3.57*	3.83*	4.34*	5.94*	7.63*	
	5	0.88	0.96	1.15	1.24	1.33	1.42	1.60*	1.70*	1.89*	2.43*	2.94*	
	10	1.05	1.15	1.37	1.48	1.59	1.69	1.91*	2.02*	2.25*	2.90*	3.53*	
	20	1.27	1.39	1.66	1.80	1.93	2.06	2.32*	2.47*	2.75*	3.58*	4.39*	
	30	1.43	1.57	1.88	2.03	2.18	2.33	2.64*	2.81*	3.14*	4.12*	5.09*	
	40	1.57	1.72	2.06	2.23	2.40	2.57	2.91*	3.10*	3.48*	4.59*	5.71*	
	60	1.78	1.96	2.36	2.56	2.76	2.96	3.38*	3.60*	4.06*	5.43*	6.84*	
	70	1.88	2.07	2.49	2.71	2.92	3.14	3.59*	3.83*	4.32*	5.81*	7.36*	
250	80	1.96	2.17	2.62	2.84	3.07	3.30	3.78*	4.04*	4.57*	6.19*	7.87*	
	5	0.92	1.01	1.21	1.30	1.40	1.49	1.68*	1.78*	1.98*	2.54*	3.07*	
	10	1.11	1.21	1.44	1.56	1.67	1.78	2.00*	2.12*	2.36*	3.04*	3.69*	
	20	1.35	1.48	1.76	1.90	2.04	2.17	2.45*	2.60*	2.89*	3.75*	4.59*	
	30	1.53	1.67	1.99	2.15	2.31	2.47	2.78*	2.96*	3.30*	4.31*	5.31*	
	40	1.67	1.83	2.19	2.36	2.54	2.71	3.07*	3.26*	3.65*	4.80*	5.94*	
	60	1.90	2.09	2.51	2.71	2.92	3.13	3.55*	3.79*	4.25*	5.65*	7.07*	
	70	2.00	2.21	2.65	2.87	3.09	3.31	3.77*	4.02*	4.52*	6.04*	7.60*	
300	80	2.10	2.31	2.78	3.01	3.25	3.48	3.97*	4.24*	4.78*	6.41*	8.10*	
	5	0.97	1.06	1.26	1.36	1.46	1.55	1.75*	1.85*	2.05*	2.63*	3.18*	
	10	1.16	1.27	1.51	1.63	1.75	1.86	2.09*	2.22*	2.46*	3.16*	3.83*	
	20	1.42	1.55	1.85	1.99	2.13	2.27	2.56*	2.71*	3.02*	3.91*	4.76*	
	30	1.61	1.76	2.09	2.26	2.42	2.58	2.91*	3.09*	3.45*	4.48*	5.50*	
	40	1.76	1.93	2.30	2.48	2.66	2.84	3.21*	3.41*	3.81*	4.98*	6.15*	
	60	2.01	2.21	2.64	2.85	3.06	3.27	3.71*	3.95*	4.43*	5.85*	7.29*	
	70	2.12	2.33	2.78	3.01	3.24	3.46	3.93*	4.19*	4.70*	6.25*	7.82*	
400	80	2.21	2.44	2.92	3.16	3.40	3.64	4.14*	4.42*	4.97*	6.62*	8.33*	
	5	1.04	1.14	1.35	1.45	1.56	1.66	1.86*	1.97*	2.19*	2.80*	3.38*	
	10	1.26	1.37	1.63	1.75	1.87	2.00	2.24*	2.37*	2.63*	3.38*	4.08*	
	20	1.54	1.69	2.00	2.15	2.30	2.45	2.75*	2.91*	3.24*	4.17*	5.07*	
	30	1.75	1.91	2.27	2.44	2.61	2.78	3.13*	3.32*	3.70*	4.79*	5.85*	
	40	1.92	2.10	2.49	2.68	2.87	3.06	3.45*	3.66*	4.08*	5.31*	6.52*	
	60	2.19	2.40	2.86	3.08	3.31	3.53	3.99*	4.24*	4.74*	6.22*	7.69*	
	70	2.31	2.53	3.02	3.26	3.50	3.73	4.22*	4.49*	5.03*	6.63*	8.23*	
80	2.42	2.65	3.16	3.42	3.67	3.92	4.44*	4.73*	5.30*	7.01*	8.74*		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.5 m (RADIUS = 2.5 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	°C												
	5	0.53	0.63	0.85	0.95	1.06	1.17	1.40*	1.51*	1.73*	2.40*	3.08*	
	10	0.61	0.74	1.02	1.16	1.31	1.45	1.74*	1.89*	2.19*	3.10*	4.03*	
	20	0.74	0.93	1.32	1.52	1.72	1.92	2.33*	2.54*	2.96*	4.27*	5.63*	
	30	0.86	1.09	1.58	1.82	2.07	2.33	2.84*	3.10*	3.64*	5.30*	7.04*	
	40	0.96	1.24	1.81	2.11	2.40	2.70	3.31*	3.63*	4.26*	6.24*	8.33*	
	60	1.16	1.52	2.25	2.62	3.00	3.39	4.18*	4.58*	5.40*	7.97*	10.69*	
	70	1.25	1.65	2.45	2.87	3.28	3.71	4.58*	5.03*	5.93*	8.78*	11.80*	
10	80	1.34	1.77	2.65	3.10	3.56	4.02	4.97*	5.46*	6.45*	9.56*	12.86*	
	5	0.72	0.80	1.00	1.10	1.21	1.31	1.52*	1.63*	1.85*	2.51*	3.18*	
	10	0.82	0.93	1.18	1.31	1.44	1.57	1.85*	2.00*	2.29*	3.19*	4.12*	
	20	0.97	1.12	1.46	1.64	1.83	2.02	2.42*	2.63*	3.05*	4.35*	5.71*	
	30	1.09	1.27	1.71	1.94	2.18	2.42	2.93*	3.19*	3.72*	5.37*	7.11*	
	40	1.19	1.42	1.94	2.21	2.50	2.79	3.39*	3.70*	4.33*	6.31*	8.39*	
	60	1.38	1.68	2.36	2.72	3.09	3.47	4.25*	4.65*	5.47*	8.03*	10.75*	
	70	1.47	1.80	2.56	2.96	3.37	3.79	4.65*	5.09*	6.00*	8.84*	11.85*	
20	80	1.55	1.92	2.75	3.19	3.64	4.09	5.04*	5.52*	6.51*	9.62*	12.92*	
	5	0.80	0.89	1.09	1.20	1.30	1.41	1.62*	1.73*	1.95*	2.61*	3.28*	
	10	0.92	1.03	1.29	1.42	1.55	1.68	1.95*	2.10*	2.39*	3.28*	4.20*	
	20	1.10	1.24	1.58	1.75	1.94	2.12	2.51*	2.72*	3.13*	4.43*	5.78*	
	30	1.23	1.41	1.82	2.05	2.28	2.51	3.01*	3.27*	3.79*	5.44*	7.17*	
	40	1.35	1.56	2.05	2.32	2.59	2.88	3.47*	3.78*	4.41*	6.38*	8.45*	
	60	1.55	1.82	2.47	2.82	3.18	3.55	4.32*	4.72*	5.53*	8.09*	10.81*	
	70	1.64	1.95	2.66	3.05	3.45	3.86	4.72*	5.16*	6.06*	8.90*	11.91*	
50	80	1.72	2.06	2.85	3.28	3.72	4.17	5.10*	5.58*	6.57*	9.68*	12.97*	
	5	0.94	1.04	1.27	1.38	1.49	1.60	1.83*	1.95*	2.18*	2.87*	3.55*	
	10	1.11	1.23	1.50	1.64	1.78	1.91	2.19*	2.34*	2.64*	3.54*	4.45*	
	20	1.33	1.49	1.84	2.01	2.20	2.38	2.76*	2.97*	3.38*	4.66*	6.00*	
	30	1.50	1.69	2.10	2.32	2.54	2.77	3.25*	3.50*	4.02*	5.65*	7.37*	
	40	1.64	1.86	2.34	2.59	2.86	3.13	3.70*	4.00*	4.62*	6.57*	8.64*	
	60	1.88	2.15	2.76	3.09	3.43	3.78	4.53*	4.92*	5.73*	8.27*	10.97*	
	70	1.99	2.28	2.95	3.32	3.70	4.09	4.92*	5.36*	6.25*	9.07*	12.07*	
100	80	2.09	2.40	3.14	3.54	3.96	4.39	5.30*	5.78*	6.75*	9.84*	13.12*	
	5	1.09	1.20	1.45	1.57	1.69	1.81	2.05*	2.18*	2.44*	3.17*	3.88*	
	10	1.30	1.43	1.73	1.88	2.03	2.17	2.47*	2.63*	2.95*	3.88*	4.82*	
	20	1.58	1.75	2.12	2.31	2.50	2.69	3.09*	3.30*	3.72*	5.01*	6.34*	
	30	1.79	1.99	2.43	2.65	2.88	3.11	3.59*	3.85*	4.37*	5.99*	7.69*	
	40	1.96	2.18	2.69	2.95	3.21	3.48	4.04*	4.34*	4.96*	6.89*	8.94*	
	60	2.24	2.52	3.14	3.46	3.79	4.14	4.86*	5.25*	6.05*	8.57*	11.25*	
	70	2.37	2.67	3.34	3.70	4.06	4.44	5.24*	5.68*	6.56*	9.35*	12.33*	
80	2.48	2.81	3.53	3.92	4.32	4.74	5.62*	6.09*	7.05*	10.12*	13.38*		

SPACING = 3.5 m (RADIUS = 2.5 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
150 (m*s) ^{1/2}	5	1.20	1.32	1.58	1.71	1.84	1.96	2.22*	2.36*	2.62*	3.40*	4.15*
	10	1.44	1.58	1.90	2.05	2.21	2.37	2.68*	2.85*	3.18*	4.16*	5.13*
	20	1.76	1.94	2.34	2.53	2.73	2.93	3.34*	3.56*	4.00*	5.32*	6.67*
	30	1.99	2.20	2.67	2.90	3.14	3.38	3.87*	4.13*	4.67*	6.30*	8.00*
	40	2.19	2.43	2.95	3.22	3.49	3.76	4.33*	4.64*	5.27*	7.20*	9.24*
	60	2.51	2.80	3.43	3.76	4.10	4.44	5.16*	5.55*	6.35*	8.86*	11.52*
	70	2.65	2.96	3.65	4.01	4.37	4.75	5.55*	5.98*	6.86*	9.63*	12.60*
	80	2.77	3.11	3.85	4.24	4.64	5.05	5.92*	6.39*	7.35*	10.39*	13.64*
200	5	1.28	1.41	1.68	1.82	1.95	2.09	2.35*	2.50*	2.78*	3.59*	4.37*
	10	1.55	1.70	2.03	2.20	2.36	2.52	2.85*	3.03*	3.38*	4.40*	5.39*
	20	1.90	2.09	2.51	2.72	2.92	3.13	3.55*	3.78*	4.24*	5.60*	6.96*
	30	2.16	2.38	2.87	3.11	3.36	3.60	4.10*	4.38*	4.93*	6.59*	8.30*
	40	2.37	2.62	3.17	3.45	3.73	4.00	4.59*	4.90*	5.54*	7.49*	9.53*
	60	2.72	3.02	3.68	4.02	4.36	4.71	5.43*	5.83*	6.63*	9.14*	11.79*
	70	2.87	3.20	3.91	4.27	4.64	5.02	5.82*	6.25*	7.14*	9.91*	12.86*
	80	3.01	3.36	4.12	4.51	4.91	5.33	6.19*	6.66*	7.63*	10.66*	13.89*
250	5	1.36	1.49	1.77	1.92	2.06	2.19	2.47*	2.62*	2.91*	3.75*	4.56*
	10	1.65	1.80	2.15	2.32	2.49	2.66	3.00*	3.18*	3.55*	4.60*	5.62*
	20	2.03	2.22	2.66	2.87	3.09	3.30	3.74*	3.98*	4.45*	5.84*	7.23*
	30	2.30	2.54	3.04	3.29	3.54	3.79	4.31*	4.60*	5.16*	6.85*	8.58*
	40	2.53	2.79	3.36	3.64	3.93	4.22	4.81*	5.13*	5.79*	7.76*	9.80*
	60	2.91	3.22	3.90	4.24	4.59	4.94	5.68*	6.08*	6.89*	9.41*	12.05*
	70	3.07	3.40	4.13	4.51	4.88	5.27	6.07*	6.51*	7.40*	10.18*	13.11*
	80	3.22	3.57	4.35	4.75	5.16	5.58	6.45*	6.92*	7.89*	10.92*	14.14*
300	5	1.42	1.56	1.85	2.00	2.15	2.29	2.57*	2.73*	3.03*	3.90*	4.72*
	10	1.73	1.89	2.25	2.43	2.61	2.78	3.13*	3.32*	3.70*	4.78*	5.83*
	20	2.14	2.34	2.79	3.01	3.23	3.45	3.90*	4.15*	4.63*	6.06*	7.48*
	30	2.43	2.67	3.19	3.45	3.71	3.97	4.50*	4.79*	5.37*	7.10*	8.84*
	40	2.67	2.94	3.53	3.82	4.11	4.41	5.01*	5.35*	6.01*	8.01*	10.07*
	60	3.07	3.39	4.09	4.44	4.80	5.15	5.90*	6.31*	7.13*	9.67*	12.31*
	70	3.24	3.58	4.33	4.72	5.10	5.49	6.30*	6.75*	7.65*	10.43*	13.37*
	80	3.40	3.76	4.56	4.97	5.39	5.80	6.68*	7.16*	8.14*	11.17*	14.39*
400	5	1.54	1.68	1.99	2.15	2.30	2.45	2.75*	2.91*	3.24*	4.15*	5.02*
	10	1.88	2.05	2.43	2.62	2.80	2.99	3.36*	3.56*	3.96*	5.10*	6.20*
	20	2.32	2.54	3.02	3.26	3.49	3.72	4.19*	4.45*	4.96*	6.45*	7.92*
	30	2.65	2.90	3.46	3.73	4.00	4.27	4.83*	5.13*	5.74*	7.53*	9.32*
	40	2.92	3.20	3.82	4.13	4.43	4.74	5.37*	5.72*	6.41*	8.47*	10.56*
	60	3.35	3.69	4.42	4.79	5.16	5.53	6.30*	6.72*	7.57*	10.15*	12.81*
	70	3.54	3.90	4.69	5.08	5.48	5.88	6.71*	7.17*	8.10*	10.92*	13.86*
	80	3.71	4.09	4.93	5.36	5.78	6.21	7.11*	7.60*	8.60*	11.66*	14.87*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.5 m (RADIUS = 2.5 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
0	5	0.78	0.94	1.29	1.47	1.65	1.83	2.19*	2.37*	2.74*	3.86*	5.01*
	10	0.94	1.17	1.64	1.89	2.13	2.38	2.89*	3.14*	3.66*	5.26*	6.92*
	20	1.20	1.54	2.23	2.59	2.95	3.31	4.06*	4.43*	5.20*	7.60*	10.12*
	30	1.43	1.87	2.75	3.20	3.66	4.13	5.08*	5.57*	6.56*	9.66*	12.94*
	40	1.64	2.17	3.23	3.77	4.32	4.88	6.03*	6.61*	7.80*	11.55*	15.52*
	60	2.03	2.72	4.10	4.81	5.52	6.25	7.75*	8.52*	10.08*	15.01*	20.25*
	70	2.21	2.98	4.51	5.29	6.09	6.90	8.56*	9.41*	11.15*	16.63*	22.46*
	80	2.39	3.23	4.90	5.76	6.63	7.52	9.34*	10.27*	12.18*	18.19*	24.59*
10	5	1.03	1.16	1.47	1.64	1.80	1.97	2.32*	2.50*	2.86*	3.97*	5.11*
	10	1.21	1.39	1.81	2.04	2.27	2.51	3.00*	3.25*	3.76*	5.35*	7.01*
	20	1.47	1.75	2.38	2.72	3.06	3.42	4.15*	4.53*	5.29*	7.68*	10.20*
	30	1.70	2.06	2.88	3.32	3.77	4.23	5.17*	5.65*	6.64*	9.73*	13.00*
	40	1.90	2.35	3.35	3.88	4.42	4.97	6.10*	6.69*	7.88*	11.62*	15.58*
	60	2.27	2.89	4.21	4.90	5.61	6.33	7.82*	8.59*	10.15*	15.07*	20.30*
	70	2.44	3.14	4.62	5.38	6.17	6.97	8.63*	9.48*	11.21*	16.69*	22.51*
	80	2.61	3.38	5.01	5.85	6.71	7.59	9.40*	10.33*	12.24*	18.25*	24.64*
20	5	1.15	1.29	1.60	1.77	1.93	2.10	2.44*	2.62*	2.98*	4.08*	5.22*
	10	1.36	1.54	1.95	2.17	2.40	2.63	3.10*	3.35*	3.86*	5.44*	7.09*
	20	1.66	1.91	2.52	2.84	3.18	3.52	4.24*	4.62*	5.38*	7.76*	10.27*
	30	1.89	2.23	3.01	3.43	3.87	4.32	5.25*	5.73*	6.72*	9.81*	13.07*
	40	2.10	2.52	3.47	3.98	4.51	5.06	6.18*	6.76*	7.95*	11.69*	15.64*
	60	2.48	3.04	4.32	5.00	5.70	6.42	7.89*	8.66*	10.22*	15.13*	20.36*
	70	2.65	3.29	4.72	5.48	6.26	7.05	8.70*	9.54*	11.28*	16.75*	22.56*
	80	2.82	3.53	5.11	5.94	6.79	7.67	9.47*	10.40*	12.30*	18.30*	24.69*
50	5	1.37	1.52	1.86	2.03	2.20	2.37	2.72*	2.91*	3.28*	4.39*	5.51*
	10	1.64	1.83	2.26	2.48	2.70	2.93	3.40*	3.65*	4.15*	5.72*	7.35*
	20	2.01	2.27	2.86	3.17	3.49	3.82	4.51*	4.88*	5.63*	8.00*	10.49*
	30	2.29	2.62	3.36	3.76	4.17	4.60	5.50*	5.98*	6.95*	10.02*	13.27*
	40	2.53	2.92	3.81	4.29	4.80	5.32	6.42*	6.99*	8.17*	11.88*	15.83*
	60	2.95	3.46	4.64	5.29	5.96	6.65	8.11*	8.86*	10.41*	15.31*	20.52*
	70	3.13	3.71	5.03	5.75	6.51	7.28	8.90*	9.74*	11.47*	16.92*	22.72*
	80	3.31	3.94	5.41	6.21	7.03	7.89	9.67*	10.59*	12.48*	18.47*	24.85*
100	5	1.60	1.77	2.13	2.32	2.50	2.68	3.05*	3.25*	3.64*	4.80*	5.95*
	10	1.93	2.14	2.60	2.83	3.07	3.30	3.78*	4.04*	4.56*	6.14*	7.76*
	20	2.38	2.66	3.27	3.59	3.91	4.24	4.92*	5.29*	6.04*	8.38*	10.85*
	30	2.72	3.06	3.81	4.20	4.60	5.02	5.90*	6.37*	7.33*	10.37*	13.59*
	40	3.01	3.40	4.28	4.75	5.23	5.73	6.79*	7.36*	8.53*	12.21*	16.13*
	60	3.48	3.98	5.12	5.73	6.37	7.04	8.45*	9.20*	10.74*	15.61*	20.80*
	70	3.69	4.24	5.51	6.19	6.91	7.66	9.24*	10.07*	11.78*	17.21*	22.99*
	80	3.89	4.49	5.88	6.64	7.43	8.25	9.99*	10.91*	12.79*	18.75*	25.11*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.5 m (RADIUS = 2.5 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

CEILING HEIGHT, m

RESPONSE
TIME INDEX

TEMPERATURE
RISE

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	1.77	1.94	2.33	2.53	2.72	2.91	3.30*	3.51*	3.92*	5.13*	6.31*
	10	2.15	2.37	2.85	3.10	3.34	3.59	4.09*	4.36*	4.90*	6.51*	8.15*
	20	2.66	2.95	3.59	3.91	4.24	4.57	5.27*	5.64*	6.40*	8.74*	11.20*
	30	3.04	3.39	4.16	4.56	4.97	5.38	6.25*	6.73*	7.69*	10.71*	13.92*
	40	3.35	3.76	4.66	5.13	5.61	6.10	7.15*	7.72*	8.87*	12.53*	16.44*
	60	3.88	4.39	5.52	6.13	6.76	7.41	8.79*	9.54*	11.06*	15.91*	21.08*
	70	4.11	4.66	5.92	6.59	7.29	8.02	9.57*	10.39*	12.09*	17.49*	23.26*
	80	4.32	4.93	6.30	7.04	7.81	8.61	10.31*	11.22*	13.09*	19.02*	25.36*
200	5	1.90	2.08	2.49	2.70	2.90	3.10	3.50*	3.72*	4.15*	5.41*	6.63*
	10	2.32	2.55	3.06	3.32	3.57	3.82	4.34*	4.62*	5.18*	6.83*	8.50*
	20	2.88	3.18	3.85	4.18	4.52	4.86	5.57*	5.95*	6.73*	9.09*	11.55*
	30	3.29	3.65	4.45	4.86	5.28	5.70	6.58*	7.05*	8.02*	11.04*	14.24*
	40	3.64	4.05	4.97	5.45	5.94	6.43	7.48*	8.05*	9.21*	12.85*	16.74*
	60	4.20	4.72	5.87	6.48	7.11	7.75	9.12*	9.86*	11.38*	16.20*	21.35*
	70	4.45	5.02	6.28	6.95	7.64	8.36	9.89*	10.71*	12.40*	17.77*	23.52*
	80	4.68	5.29	6.67	7.40	8.16	8.95	10.63*	11.53*	13.39*	19.30*	25.62*
250	5	2.01	2.21	2.63	2.85	3.06	3.26	3.68*	3.91*	4.35*	5.65*	6.90*
	10	2.46	2.71	3.24	3.50	3.77	4.03	4.56*	4.85*	5.43*	7.12*	8.81*
	20	3.07	3.38	4.07	4.42	4.77	5.11	5.83*	6.23*	7.02*	9.41*	11.88*
	30	3.51	3.89	4.71	5.13	5.55	5.98	6.87*	7.35*	8.33*	11.37*	14.55*
	40	3.88	4.31	5.25	5.74	6.23	6.73	7.78*	8.36*	9.52*	13.16*	17.04*
	60	4.48	5.01	6.19	6.80	7.42	8.07	9.43*	10.17*	11.69*	16.49*	21.63*
	70	4.75	5.32	6.60	7.28	7.97	8.68	10.19*	11.02*	12.70*	18.05*	23.79*
	80	4.99	5.61	7.00	7.73	8.49	9.27	10.93*	11.84*	13.69*	19.57*	25.88*
300	5	2.11	2.31	2.76	2.98	3.19	3.40	3.84*	4.07*	4.53*	5.87*	7.15*
	10	2.59	2.84	3.39	3.67	3.94	4.21	4.76*	5.06*	5.65*	7.39*	9.11*
	20	3.23	3.56	4.27	4.63	4.98	5.34	6.08*	6.48*	7.28*	9.71*	12.19*
	30	3.70	4.09	4.94	5.37	5.80	6.23	7.13*	7.63*	8.62*	11.67*	14.86*
	40	4.09	4.54	5.50	6.00	6.50	7.00	8.06*	8.64*	9.82*	13.47*	17.33*
	60	4.73	5.27	6.47	7.08	7.71	8.36	9.72*	10.47*	11.98*	16.78*	21.90*
	70	5.01	5.60	6.90	7.57	8.27	8.98	10.49*	11.31*	13.00*	18.33*	24.05*
	80	5.26	5.90	7.30	8.04	8.79	9.57	11.23*	12.13*	13.98*	19.84*	26.13*
400	5	2.29	2.50	2.97	3.20	3.43	3.65	4.11*	4.35*	4.84*	6.24*	7.59*
	10	2.82	3.08	3.67	3.96	4.24	4.52	5.10*	5.41*	6.04*	7.85*	9.63*
	20	3.52	3.87	4.62	4.99	5.37	5.74	6.50*	6.92*	7.76*	10.26*	12.78*
	30	4.04	4.45	5.34	5.78	6.23	6.68	7.61*	8.12*	9.14*	12.25*	15.45*
	40	4.46	4.93	5.94	6.45	6.97	7.49	8.57*	9.16*	10.36*	14.05*	17.91*
	60	5.16	5.73	6.96	7.59	8.24	8.89	10.26*	11.02*	12.55*	17.34*	22.44*
	70	5.46	6.07	7.41	8.10	8.81	9.52	11.04*	11.87*	13.56*	18.88*	24.57*
	80	5.74	6.40	7.84	8.58	9.35	10.13	11.78*	12.69*	14.53*	20.38*	26.64*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.5 m (RADIUS = 2.5 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2} 0	5	1.18	1.47	2.05	2.35	2.66	2.96	3.58*	3.90*	4.53*	6.49*	8.52*
	10	1.50	1.91	2.76	3.19	3.63	4.07	4.98*	5.44*	6.37*	9.28*	12.33*
	20	2.03	2.66	3.94	4.60	5.26	5.94	7.32*	8.02*	9.46*	13.97*	18.74*
	30	2.49	3.32	4.98	5.83	6.69	7.57	9.37*	10.29*	12.17*	18.09*	24.36*
	40	2.91	3.92	5.93	6.96	8.01	9.07	11.26*	12.37*	14.66*	21.87*	29.53*
	60	3.69	5.03	7.68	9.03	10.41	11.82	14.71*	16.19*	19.22*	28.79*	38.98*
	70	4.05	5.55	8.49	10.00	11.54	13.10	16.32*	17.97*	21.35*	32.03*	43.40*
	80	4.41	6.04	9.28	10.93	12.62	14.34	17.88*	19.69*	23.41*	35.15*	47.67*
10	5	1.51	1.73	2.25	2.53	2.82	3.11	3.71*	4.03*	4.65*	6.60*	8.62*
	10	1.82	2.16	2.93	3.34	3.76	4.20	5.09*	5.54*	6.47*	9.37*	12.42*
	20	2.33	2.87	4.09	4.72	5.38	6.04	7.41*	8.11*	9.55*	14.05*	18.82*
	30	2.77	3.51	5.11	5.94	6.80	7.67	9.45*	10.37*	12.25*	18.16*	24.43*
	40	3.18	4.10	6.05	7.07	8.10	9.16	11.33*	12.45*	14.73*	21.94*	29.59*
	60	3.93	5.19	7.79	9.13	10.50	11.90	14.78*	16.26*	19.29*	28.85*	39.04*
	70	4.29	5.70	8.60	10.09	11.62	13.18	16.39*	18.04*	21.41*	32.09*	43.46*
	80	4.63	6.20	9.38	11.02	12.70	14.42	17.95*	19.76*	23.47*	35.21*	47.72*
20	5	1.69	1.91	2.42	2.69	2.97	3.25	3.84*	4.15*	4.78*	6.71*	8.72*
	10	2.04	2.36	3.09	3.49	3.90	4.32	5.20*	5.65*	6.58*	9.47*	12.50*
	20	2.57	3.07	4.23	4.85	5.49	6.15	7.50*	8.21*	9.64*	14.13*	18.89*
	30	3.02	3.70	5.24	6.06	6.90	7.76	9.54*	10.46*	12.33*	18.23*	24.50*
	40	3.42	4.28	6.18	7.17	8.20	9.25	11.41*	12.53*	14.81*	22.00*	29.65*
	60	4.16	5.35	7.90	9.23	10.59	11.98	14.85*	16.33*	19.35*	28.91*	39.10*
	70	4.51	5.86	8.70	10.19	11.71	13.26	16.46*	18.11*	21.48*	32.14*	43.51*
	80	4.85	6.35	9.48	11.12	12.79	14.49	18.01*	19.82*	23.53*	35.26*	47.77*
50	5	2.02	2.26	2.79	3.06	3.34	3.62	4.19*	4.50*	5.12*	7.03*	9.03*
	10	2.46	2.78	3.50	3.88	4.27	4.67	5.52*	5.97*	6.88*	9.74*	12.76*
	20	3.09	3.55	4.63	5.22	5.83	6.46	7.78*	8.48*	9.89*	14.37*	19.11*
	30	3.58	4.19	5.62	6.40	7.21	8.04	9.79*	10.70*	12.56*	18.45*	24.70*
	40	4.01	4.77	6.53	7.49	8.49	9.51	11.65*	12.76*	15.03*	22.20*	29.84*
	60	4.77	5.82	8.22	9.51	10.85	12.22	15.06*	16.54*	19.55*	29.09*	39.26*
	70	5.12	6.31	9.02	10.47	11.96	13.49	16.66*	18.31*	21.67*	32.32*	43.67*
	80	5.45	6.79	9.79	11.39	13.03	14.72	18.21*	20.02*	23.71*	35.43*	47.93*
100	5	2.37	2.63	3.19	3.48	3.77	4.06	4.65*	4.97*	5.61*	7.54*	9.52*
	10	2.91	3.24	3.99	4.38	4.77	5.17	6.00*	6.45*	7.36*	10.20*	13.19*
	20	3.65	4.12	5.19	5.76	6.34	6.95	8.23*	8.92*	10.32*	14.76*	19.47*
	30	4.21	4.81	6.19	6.93	7.70	8.51	10.21*	11.11*	12.95*	18.80*	25.03*
	40	4.70	5.42	7.09	8.00	8.96	9.95	12.04*	13.14*	15.39*	22.53*	30.14*
	60	5.52	6.50	8.75	9.99	11.28	12.62	15.42*	16.88*	19.88*	29.39*	39.54*
	70	5.90	6.99	9.53	10.92	12.37	13.87	17.00*	18.64*	21.99*	32.60*	43.94*
	80	6.25	7.47	10.29	11.83	13.43	15.09	18.54*	20.34*	24.02*	35.71*	48.19*

SPACING = 3.5 m (RADIUS = 2.5 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TEMPERATURE
 TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	1	2	4	5	6	7	9	10	12	18	24
150	2.62 3.23 4.06 4.68 5.21 6.11 6.50 6.88	2.89 3.58 4.55 5.30 5.94 7.06 7.57 8.05	3.49 4.37 5.64 6.67 7.59 9.25 10.02 10.77	3.80 4.77 6.21 7.40 8.48 10.45 11.37 12.27	4.10 5.17 6.79 8.16 9.41 11.70 12.78 13.83	4.40 5.57 7.39 8.94 10.37 13.01 14.25 15.45	5.01* 6.42* 8.65* 10.61* 12.42* 15.77* 17.34* 18.87*	5.34* 6.87* 9.34* 11.50* 13.51* 17.22* 18.97* 20.66*	6.00* 7.79* 10.73* 13.34* 15.75* 20.21* 22.30* 24.33*	7.98* 10.63* 15.14* 19.15* 22.86* 29.69* 32.89* 35.99*	9.98* 13.61* 19.83* 25.35* 30.45* 39.82* 44.21* 48.45*
200	2.83 3.49 4.39 5.07 5.64 6.59 7.01 7.40	3.11 3.86 4.90 5.70 6.38 7.54 8.07 8.57	3.74 4.68 6.02 7.09 8.03 9.71 10.48 11.23	4.05 5.09 6.59 7.82 8.91 10.88 11.80 12.69	4.37 5.50 7.18 8.57 9.83 12.11 13.18 14.22	4.68 5.91 7.78 9.35 10.77 13.39 14.62 15.82	5.31* 6.77* 9.05* 11.00* 12.79* 16.11* 17.68* 19.19*	5.66* 7.24* 9.73* 11.89* 13.88* 17.56* 19.29* 20.97*	6.34* 8.18* 11.13* 13.71* 16.11* 20.53* 22.62* 24.63*	8.36* 11.04* 15.52* 19.50* 23.19* 29.99* 33.18* 36.26*	10.39* 14.02* 20.19* 25.68* 30.76* 40.10* 44.48* 48.70*
250	3.00 3.72 4.68 5.40 6.01 7.01 7.45 7.86	3.30 4.10 5.20 6.04 6.76 7.97 8.51 9.02	3.95 4.94 6.35 7.46 8.42 10.13 10.91 11.66	4.28 5.37 6.94 8.19 9.30 11.29 12.21 13.10	4.60 5.79 7.53 8.95 10.22 12.50 13.57 14.61	4.92 6.21 8.14 9.72 11.15 13.77 14.99 16.18	5.57* 7.09* 9.41* 11.36* 13.15* 16.45* 18.01* 19.51*	5.93* 7.57* 10.10* 12.26* 14.24* 17.90* 19.62* 21.29*	6.63* 8.53* 11.50* 14.08* 16.46* 20.86* 22.93* 24.93*	8.71* 11.43* 15.89* 19.84* 23.51* 30.28* 33.46* 36.54*	10.77* 14.41* 20.55* 26.01* 31.06* 40.37* 44.74* 48.96*
300	3.16 3.92 4.94 5.70 6.33 7.38 7.84 8.27	3.46 4.31 5.47 6.35 7.09 8.35 8.91 9.44	4.14 5.18 6.65 7.79 8.78 10.52 11.31 12.07	4.47 5.62 7.24 8.54 9.67 11.68 12.60 13.49	4.81 6.05 7.85 9.30 10.58 12.88 13.95 14.98	5.14 6.48 8.46 10.07 11.51 14.13 15.35 16.53	5.81* 7.38* 9.74* 11.71* 13.50* 16.79* 18.34* 19.83*	6.17* 7.87* 10.44* 12.61* 14.59* 18.23* 19.94* 21.60*	6.90* 8.84* 11.86* 14.43* 16.80* 21.18* 23.24* 25.24*	9.02* 11.78* 16.25* 20.19* 23.83* 30.58* 33.75* 36.81*	11.12* 14.79* 20.90* 26.33* 31.36* 40.65* 45.01* 49.22*
400	3.42 4.26 5.38 6.21 6.90 8.04 8.53 8.99	3.75 4.68 5.94 6.89 7.69 9.03 9.62 10.17	4.46 5.59 7.17 8.38 9.42 11.22 12.03 12.81	4.82 6.05 7.79 9.14 10.32 12.38 13.32 14.22	5.17 6.50 8.41 9.92 11.24 13.58 14.65 15.68	5.51 6.95 9.03 10.70 12.18 14.81 16.03 17.21	6.21* 7.88* 10.34* 12.36* 14.16* 17.44* 18.98* 20.46*	6.60* 8.39* 11.06* 13.26* 15.25* 18.87* 20.57* 22.22*	7.36* 9.41* 12.50* 15.10* 17.47* 21.81* 23.85* 25.84*	9.58* 12.43* 16.94* 20.85* 24.47* 31.16* 34.31* 37.36*	11.75* 15.48* 21.58* 26.97* 31.97* 41.20* 45.54* 49.73*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 m (RADIUS = 2.8 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	°C												
	5	0.41	0.47	0.61	0.68	0.75	0.82	0.96	1.03*	1.17*	1.59*	2.00*	
	10	0.46	0.53	0.70	0.79	0.88	0.96	1.14	1.23*	1.41*	1.94*	2.49*	
	20	0.53	0.63	0.86	0.98	1.09	1.21	1.45	1.57*	1.81*	2.55*	3.31*	
	30	0.59	0.72	1.00	1.14	1.28	1.42	1.71	1.86*	2.16*	3.07*	4.03*	
	40	0.65	0.81	1.13	1.29	1.46	1.62	1.96	2.13*	2.48*	3.56*	4.68*	
	60	0.76	0.96	1.36	1.57	1.77	1.98	2.41	2.63*	3.07*	4.45*	5.89*	
	70	0.81	1.03	1.47	1.70	1.92	2.15	2.62	2.86*	3.35*	4.86*	6.46*	
10	80	0.86	1.10	1.58	1.82	2.07	2.32	2.83	3.08*	3.61*	5.26*	7.00*	
	5	0.55	0.61	0.74	0.81	0.87	0.94	1.07	1.14*	1.28*	1.69*	2.10*	
	10	0.62	0.69	0.84	0.92	1.00	1.08	1.25	1.33*	1.51*	2.04*	2.58*	
	20	0.72	0.80	1.00	1.10	1.21	1.32	1.54	1.66*	1.89*	2.62*	3.38*	
	30	0.79	0.89	1.13	1.26	1.39	1.52	1.80	1.94*	2.24*	3.15*	4.09*	
	40	0.86	0.97	1.25	1.40	1.56	1.71	2.04	2.21*	2.55*	3.63*	4.75*	
	60	0.97	1.12	1.47	1.67	1.86	2.07	2.48	2.70*	3.14*	4.51*	5.95*	
	70	1.02	1.19	1.58	1.79	2.01	2.23	2.69	2.93*	3.41*	4.92*	6.51*	
20	80	1.07	1.25	1.68	1.91	2.15	2.39	2.89	3.15*	3.67*	5.32*	7.05*	
	5	0.61	0.67	0.80	0.87	0.94	1.01	1.15	1.22*	1.36*	1.78*	2.20*	
	10	0.70	0.76	0.92	1.00	1.09	1.17	1.33	1.42*	1.59*	2.12*	2.66*	
	20	0.81	0.90	1.09	1.20	1.30	1.41	1.63	1.74*	1.98*	2.70*	3.45*	
	30	0.90	1.00	1.23	1.36	1.48	1.61	1.88	2.02*	2.31*	3.22*	4.16*	
	40	0.97	1.09	1.36	1.50	1.65	1.80	2.12	2.28*	2.63*	3.69*	4.81*	
	60	1.10	1.24	1.58	1.76	1.95	2.15	2.56	2.77*	3.20*	4.57*	6.00*	
	70	1.15	1.31	1.68	1.89	2.10	2.31	2.76	2.99*	3.47*	4.98*	6.56*	
50	80	1.20	1.38	1.78	2.00	2.23	2.47	2.96	3.21*	3.74*	5.37*	7.10*	
	5	0.71	0.78	0.93	1.00	1.08	1.15	1.30	1.37*	1.53*	1.97*	2.41*	
	10	0.83	0.90	1.08	1.17	1.25	1.34	1.51	1.60*	1.79*	2.34*	2.89*	
	20	0.98	1.07	1.29	1.40	1.50	1.61	1.83	1.95*	2.19*	2.92*	3.66*	
	30	1.09	1.20	1.45	1.58	1.70	1.83	2.10	2.23*	2.53*	3.42*	4.35*	
	40	1.19	1.31	1.59	1.73	1.88	2.03	2.33	2.49*	2.83*	3.88*	4.99*	
	60	1.34	1.49	1.83	2.00	2.19	2.37	2.76	2.96*	3.39*	4.74*	6.17*	
	70	1.41	1.57	1.94	2.13	2.33	2.53	2.96	3.19*	3.66*	5.15*	6.72*	
100	80	1.47	1.65	2.04	2.25	2.47	2.69	3.16	3.40*	3.92*	5.54*	7.26*	
	5	0.82	0.89	1.05	1.13	1.22	1.30	1.45	1.53*	1.70*	2.19*	2.65*	
	10	0.96	1.05	1.24	1.33	1.43	1.52	1.71	1.81*	2.01*	2.60*	3.17*	
	20	1.16	1.26	1.49	1.61	1.73	1.84	2.08	2.20*	2.45*	3.21*	3.97*	
	30	1.30	1.41	1.68	1.82	1.95	2.09	2.36	2.51*	2.81*	3.72*	4.66*	
	40	1.41	1.54	1.84	2.00	2.15	2.30	2.61	2.78*	3.12*	4.18*	5.28*	
	60	1.60	1.76	2.11	2.30	2.48	2.67	3.06	3.26*	3.69*	5.03*	6.44*	
	70	1.69	1.85	2.23	2.43	2.63	2.84	3.26	3.48*	3.95*	5.43*	6.98*	
80	1.76	1.94	2.35	2.56	2.78	3.00	3.45	3.69*	4.20*	5.81*	7.51*		

SPACING = 4.0 m (RADIUS = 2.8 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TEMPERATURE
 TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	1	2	4	5	6	7	9	10	12	18	24
150	0.90	0.97	1.14	1.23	1.32	1.40	1.57	1.65*	1.83*	2.34*	2.83*
	1.06	1.15	1.35	1.46	1.56	1.66	1.86	1.96*	2.17*	2.79*	3.40*
	1.28	1.39	1.64	1.77	1.89	2.01	2.26	2.38*	2.65*	3.45*	4.23*
	1.44	1.57	1.85	2.00	2.14	2.28	2.57	2.72*	3.03*	3.98*	4.93*
	1.58	1.72	2.03	2.19	2.35	2.51	2.84	3.00*	3.36*	4.45*	5.55*
	1.79	1.96	2.33	2.52	2.71	2.91	3.30	3.50*	3.94*	5.30*	6.70*
	1.89	2.06	2.46	2.67	2.87	3.08	3.51	3.73*	4.21*	5.69*	7.24*
	1.97	2.16	2.58	2.80	3.02	3.25	3.71	3.95*	4.46*	6.07*	7.76*
200	0.96	1.03	1.22	1.31	1.40	1.49	1.66	1.75*	1.93*	2.47*	2.98*
	1.14	1.23	1.45	1.56	1.66	1.77	1.97	2.08*	2.30*	2.96*	3.58*
	1.39	1.50	1.76	1.89	2.02	2.15	2.41	2.54*	2.82*	3.65*	4.46*
	1.56	1.69	1.99	2.14	2.29	2.44	2.74	2.89*	3.22*	4.20*	5.17*
	1.71	1.85	2.19	2.35	2.52	2.69	3.02	3.19*	3.57*	4.68*	5.80*
	1.95	2.12	2.51	2.71	2.91	3.10	3.50	3.71*	4.17*	5.54*	6.95*
	2.05	2.23	2.65	2.86	3.07	3.29	3.72	3.95*	4.44*	5.93*	7.49*
	2.14	2.34	2.78	3.00	3.23	3.46	3.93	4.17*	4.70*	6.32*	8.01*
250	1.01	1.09	1.28	1.37	1.47	1.56	1.74	1.83*	2.02*	2.58*	3.11*
	1.21	1.31	1.53	1.64	1.75	1.86	2.07	2.18*	2.42*	3.10*	3.74*
	1.47	1.59	1.87	2.00	2.14	2.27	2.54	2.67*	2.97*	3.82*	4.65*
	1.67	1.80	2.11	2.27	2.43	2.58	2.89	3.04*	3.39*	4.39*	5.38*
	1.82	1.97	2.32	2.49	2.67	2.84	3.18	3.36*	3.74*	4.89*	6.03*
	2.08	2.26	2.66	2.87	3.07	3.28	3.69	3.90*	4.36*	5.76*	7.19*
	2.19	2.38	2.81	3.03	3.25	3.47	3.91	4.14*	4.64*	6.16*	7.72*
	2.29	2.49	2.95	3.18	3.41	3.65	4.12	4.37*	4.91*	6.54*	8.24*
300	1.05	1.14	1.33	1.43	1.53	1.62	1.81	1.90*	2.10*	2.68*	3.23*
	1.27	1.37	1.60	1.72	1.83	1.94	2.16	2.28*	2.52*	3.22*	3.89*
	1.55	1.67	1.96	2.10	2.24	2.38	2.65	2.79*	3.09*	3.98*	4.83*
	1.75	1.90	2.22	2.38	2.54	2.70	3.02	3.18*	3.53*	4.57*	5.58*
	1.92	2.08	2.44	2.62	2.80	2.97	3.33	3.51*	3.91*	5.08*	6.24*
	2.19	2.38	2.80	3.01	3.22	3.43	3.85	4.07*	4.54*	5.97*	7.41*
	2.31	2.51	2.95	3.18	3.40	3.63	4.08	4.31*	4.83*	6.37*	7.95*
	2.41	2.62	3.10	3.34	3.58	3.82	4.30	4.55*	5.10*	6.76*	8.46*
400	1.13	1.22	1.43	1.53	1.63	1.73	1.93	2.03*	2.24*	2.85*	3.42*
	1.37	1.48	1.72	1.85	1.97	2.09	2.32	2.44*	2.70*	3.44*	4.14*
	1.68	1.82	2.12	2.27	2.41	2.56	2.85	2.99*	3.32*	4.25*	5.14*
	1.91	2.06	2.40	2.58	2.75	2.91	3.24	3.41*	3.79*	4.88*	5.93*
	2.09	2.26	2.64	2.83	3.02	3.21	3.58	3.77*	4.19*	5.41*	6.62*
	2.39	2.59	3.03	3.26	3.48	3.70	4.13	4.36*	4.86*	6.34*	7.81*
	2.52	2.73	3.20	3.44	3.68	3.91	4.38	4.62*	5.16*	6.75*	8.36*
	2.64	2.86	3.36	3.61	3.86	4.11	4.61	4.87*	5.44*	7.15*	8.88*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 m (RADIUS = 2.8 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}	°C											
0	5	0.59	0.68	0.90	1.01	1.12	1.23	1.45	1.56*	1.78*	2.45*	3.13*
	10	0.67	0.80	1.08	1.23	1.37	1.52	1.81	1.96*	2.25*	3.17*	4.10*
	20	0.82	1.01	1.40	1.60	1.80	2.01	2.42	2.63*	3.06*	4.37*	5.74*
	30	0.95	1.19	1.68	1.93	2.18	2.44	2.96	3.22*	3.76*	5.43*	7.17*
	40	1.07	1.36	1.94	2.23	2.53	2.83	3.45	3.76*	4.40*	6.40*	8.49*
	60	1.29	1.66	2.40	2.78	3.17	3.56	4.35	4.76*	5.58*	8.17*	10.90*
	70	1.39	1.80	2.62	3.04	3.46	3.89	4.77	5.22*	6.14*	9.00*	12.03*
	80	1.48	1.94	2.83	3.29	3.75	4.22	5.18	5.67*	6.67*	9.81*	13.12*
10	5	0.79	0.87	1.06	1.16	1.26	1.37	1.57	1.68*	1.90*	2.56*	3.23*
	10	0.90	1.00	1.25	1.38	1.51	1.64	1.92	2.06*	2.36*	3.26*	4.19*
	20	1.06	1.21	1.55	1.73	1.92	2.12	2.52	2.72*	3.14*	4.45*	5.81*
	30	1.20	1.38	1.81	2.05	2.29	2.54	3.04	3.30*	3.84*	5.50*	7.24*
	40	1.31	1.54	2.06	2.34	2.63	2.93	3.53	3.84*	4.48*	6.46*	8.55*
	60	1.52	1.83	2.52	2.88	3.26	3.64	4.42	4.83*	5.65*	8.23*	10.96*
	70	1.62	1.96	2.73	3.14	3.55	3.97	4.84	5.29*	6.20*	9.06*	12.09*
	80	1.71	2.09	2.94	3.38	3.84	4.30	5.25	5.73*	6.73*	9.86*	13.17*
20	5	0.87	0.96	1.16	1.26	1.37	1.47	1.68	1.78*	2.00*	2.66*	3.33*
	10	1.01	1.11	1.36	1.49	1.62	1.76	2.03	2.17*	2.46*	3.35*	4.27*
	20	1.20	1.34	1.67	1.85	2.03	2.22	2.61	2.81*	3.23*	4.53*	5.88*
	30	1.35	1.53	1.94	2.16	2.40	2.63	3.13	3.39*	3.91*	5.57*	7.31*
	40	1.48	1.69	2.18	2.45	2.73	3.02	3.61	3.92*	4.55*	6.53*	8.61*
	60	1.70	1.98	2.63	2.98	3.35	3.72	4.50	4.90*	5.72*	8.29*	11.02*
	70	1.80	2.11	2.84	3.23	3.64	4.05	4.91	5.36*	6.26*	9.12*	12.14*
	80	1.89	2.24	3.04	3.48	3.92	4.38	5.32	5.80*	6.79*	9.92*	13.23*
50	5	1.03	1.12	1.34	1.45	1.56	1.67	1.89	2.00*	2.24*	2.92*	3.60*
	10	1.21	1.33	1.59	1.73	1.86	2.00	2.27	2.41*	2.71*	3.61*	4.52*
	20	1.46	1.61	1.95	2.13	2.31	2.49	2.86	3.06*	3.47*	4.76*	6.10*
	30	1.64	1.82	2.23	2.45	2.67	2.90	3.37	3.62*	4.14*	5.78*	7.50*
	40	1.80	2.01	2.49	2.74	3.01	3.28	3.84	4.14*	4.76*	6.73*	8.80*
	60	2.06	2.32	2.94	3.27	3.61	3.97	4.71	5.10*	5.91*	8.47*	11.18*
	70	2.18	2.47	3.14	3.51	3.89	4.29	5.12	5.55*	6.45*	9.29*	12.30*
	80	2.28	2.60	3.34	3.75	4.17	4.61	5.52	5.99*	6.98*	10.08*	13.38*
100	5	1.19	1.29	1.53	1.65	1.77	1.89	2.13	2.24*	2.50*	3.23*	3.94*
	10	1.42	1.54	1.83	1.98	2.13	2.27	2.56	2.71*	3.02*	3.96*	4.89*
	20	1.73	1.89	2.25	2.44	2.63	2.82	3.20	3.40*	3.82*	5.11*	6.45*
	30	1.95	2.14	2.58	2.80	3.03	3.26	3.72	3.97*	4.49*	6.12*	7.83*
	40	2.14	2.36	2.85	3.11	3.38	3.64	4.20	4.49*	5.11*	7.05*	9.10*
	60	2.45	2.72	3.33	3.66	3.99	4.34	5.05	5.43*	6.23*	8.77*	11.46*
	70	2.59	2.88	3.55	3.91	4.28	4.66	5.45	5.87*	6.76*	9.58*	12.57*
	80	2.71	3.03	3.76	4.15	4.55	4.97	5.84	6.30*	7.28*	10.36*	13.64*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 m (RADIUS = 2.8 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	1.31	1.42	1.67	1.80	1.93	2.05	2.30	2.42*	2.69*	3.46*	4.21*
	10	1.57	1.70	2.01	2.17	2.32	2.47	2.77	2.93*	3.26*	4.24*	5.20*
	20	1.92	2.09	2.48	2.67	2.87	3.07	3.46	3.73*	4.11*	5.43*	6.77*
	30	2.18	2.38	2.83	3.07	3.30	3.54	4.01	4.26*	4.80*	6.44*	8.14*
	40	2.39	2.62	3.13	3.40	3.67	3.94	4.50	4.79*	5.41*	7.36*	9.40*
	60	2.74	3.02	3.65	3.98	4.31	4.66	5.36	5.74*	6.54*	9.06*	11.73*
	70	2.89	3.19	3.88	4.24	4.60	4.98	5.76	6.18*	7.06*	9.86*	12.83*
	80	3.03	3.35	4.09	4.48	4.88	5.29	6.15	6.60*	7.57*	10.63*	13.89*
200	5	1.40	1.52	1.78	1.92	2.05	2.18	2.44	2.57*	2.85*	3.65*	4.43*
	10	1.69	1.83	2.16	2.32	2.48	2.64	2.95	3.11*	3.46*	4.48*	5.47*
	20	2.08	2.26	2.66	2.87	3.07	3.28	3.68	3.89*	4.35*	5.70*	7.07*
	30	2.36	2.57	3.04	3.29	3.53	3.77	4.26	4.51*	5.06*	6.72*	8.43*
	40	2.59	2.83	3.37	3.64	3.92	4.20	4.76	5.05*	5.69*	7.65*	9.69*
	60	2.97	3.26	3.91	4.25	4.59	4.93	5.64	6.01*	6.82*	9.34*	12.00*
	70	3.14	3.45	4.15	4.52	4.89	5.27	6.05	6.46*	7.35*	10.13*	13.09*
	80	3.29	3.62	4.38	4.77	5.17	5.58	6.43	6.88*	7.85*	10.90*	14.15*
250	5	1.48	1.60	1.88	2.02	2.16	2.29	2.56	2.69*	2.98*	3.82*	4.62*
	10	1.80	1.94	2.28	2.45	2.62	2.78	3.10	3.27*	3.63*	4.68*	5.70*
	20	2.21	2.40	2.82	3.03	3.25	3.46	3.87	4.09*	4.56*	5.95*	7.34*
	30	2.52	2.73	3.23	3.48	3.73	3.97	4.47	4.73*	5.30*	6.99*	8.71*
	40	2.76	3.01	3.57	3.85	4.13	4.42	4.99	5.29*	5.94*	7.92*	9.97*
	60	3.17	3.47	4.14	4.48	4.83	5.18	5.89	6.27*	7.08*	9.61*	12.27*
	70	3.35	3.67	4.39	4.76	5.14	5.52	6.30	6.72*	7.61*	10.40*	13.35*
	80	3.51	3.85	4.63	5.03	5.43	5.85	6.70	7.15*	8.12*	11.16*	14.40*
300	5	1.55	1.68	1.96	2.11	2.25	2.39	2.66	2.80*	3.10*	3.97*	4.79*
	10	1.89	2.04	2.39	2.56	2.74	2.91	3.24	3.41*	3.79*	4.87*	5.91*
	20	2.33	2.52	2.96	3.18	3.40	3.62	4.04	4.27*	4.75*	6.18*	7.59*
	30	2.65	2.88	3.39	3.64	3.90	4.16	4.67	4.93*	5.51*	7.23*	8.98*
	40	2.92	3.17	3.74	4.03	4.33	4.62	5.20	5.50*	6.17*	8.18*	10.23*
	60	3.35	3.65	4.34	4.69	5.05	5.40	6.12	6.50*	7.33*	9.87*	12.53*
	70	3.53	3.86	4.60	4.98	5.37	5.75	6.54	6.96*	7.86*	10.66*	13.60*
	80	3.71	4.06	4.85	5.26	5.67	6.09	6.94	7.39*	8.37*	11.42*	14.65*
400	5	1.68	1.81	2.11	2.26	2.41	2.56	2.85	2.99*	3.31*	4.22*	5.09*
	10	2.05	2.21	2.58	2.76	2.94	3.12	3.48	3.66*	4.05*	5.19*	6.29*
	20	2.54	2.74	3.20	3.44	3.67	3.89	4.34	4.58*	5.08*	6.57*	8.04*
	30	2.89	3.13	3.67	3.94	4.21	4.48	5.01	5.28*	5.89*	7.67*	9.46*
	40	3.18	3.45	4.05	4.36	4.66	4.97	5.57	5.89*	6.58*	8.64*	10.73*
	60	3.66	3.98	4.70	5.06	5.43	5.80	6.54	6.93*	7.77*	10.36*	13.03*
	70	3.86	4.20	4.98	5.37	5.77	6.17	6.97	7.39*	8.32*	11.15*	14.10*
	80	4.05	4.41	5.24	5.66	6.08	6.51	7.38	7.84*	8.84*	11.91*	15.13*

TIME TO ACTUATE HEAT DETECTOR, MINU^T

SPACING = 4.0 m (RADIUS = 2.8 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s)^{1/2}

	1	2	4	5	6	7	9	10	12	18	24
0	0.86	1.02	1.37	1.55	1.73	1.91	2.27	2.45*	2.82*	3.95*	5.10*
	1.04	1.27	1.75	1.99	2.24	2.49	3.00	3.25*	3.77*	5.38*	7.05*
	1.33	1.68	2.38	2.74	3.10	3.47	4.22	4.60*	5.38*	7.79*	10.32*
	1.59	2.04	2.94	3.40	3.86	4.33	5.29	5.78*	6.78*	9.90*	13.19*
	1.82	2.37	3.45	4.00	4.56	5.12	6.28	6.87*	8.07*	11.84*	15.83*
	2.26	2.98	4.39	5.10	5.83	6.57	8.08	8.86*	10.43*	15.40*	20.65*
	2.46	3.26	4.82	5.62	6.42	7.25	8.93	9.78*	11.54*	17.06*	22.91*
	2.66	3.53	5.24	6.11	7.00	7.90	9.74	10.68*	12.60*	18.66*	25.09*
10	1.13	1.26	1.56	1.73	1.89	2.06	2.40	2.58*	2.94*	4.06*	5.20*
	1.33	1.50	1.92	2.15	2.38	2.62	3.11	3.36*	3.88*	5.47*	7.13*
	1.62	1.89	2.53	2.87	3.22	3.58	4.32	4.69*	5.46*	7.87*	10.39*
	1.87	2.24	3.08	3.52	3.97	4.43	5.38	5.87*	6.86*	9.97*	13.26*
	2.09	2.56	3.58	4.11	4.66	5.22	6.36	6.95*	8.15*	11.91*	15.89*
	2.51	3.14	4.50	5.20	5.92	6.65	8.16	8.93*	10.50*	15.46*	20.71*
	2.70	3.42	4.93	5.72	6.51	7.33	9.00	9.85*	11.60*	17.11*	22.96*
	2.89	3.69	5.35	6.21	7.08	7.98	9.81	10.75*	12.67*	18.72*	25.14*
20	1.26	1.39	1.70	1.86	2.03	2.19	2.53	2.70*	3.06*	4.17*	5.31*
	1.49	1.66	2.07	2.29	2.52	2.75	3.22	3.47*	3.98*	5.57*	7.22*
	1.82	2.07	2.68	3.00	3.34	3.69	4.41	4.78*	5.55*	7.95*	10.47*
	2.08	2.42	3.21	3.64	4.08	4.53	5.47	5.95*	6.94*	10.05*	13.32*
	2.31	2.73	3.70	4.22	4.76	5.31	6.44	7.02*	8.22*	11.98*	15.95*
	2.73	3.31	4.61	5.30	6.01	6.74	8.23	8.99*	10.57*	15.52*	20.76*
	2.92	3.58	5.04	5.81	6.60	7.41	9.07	9.92*	11.67*	17.17*	23.02*
	3.11	3.84	5.46	6.30	7.17	8.05	9.87	10.81*	12.73*	18.77*	25.19*
50	1.50	1.64	1.97	2.14	2.31	2.48	2.82	3.00*	3.36*	4.47*	5.60*
	1.79	1.98	2.40	2.62	2.84	3.06	3.53	3.77*	4.27*	5.84*	7.48*
	2.20	2.45	3.05	3.35	3.67	4.00	4.69	5.05*	5.81*	8.18*	10.69*
	2.51	2.83	3.57	3.97	4.39	4.82	5.72	6.19*	7.17*	10.26*	13.52*
	2.78	3.16	4.06	4.54	5.05	5.58	6.68	7.25*	8.44*	12.17*	16.13*
	3.23	3.75	4.95	5.60	6.28	6.99	8.45	9.20*	10.76*	15.70*	20.93*
	3.44	4.02	5.37	6.10	6.86	7.65	9.28	10.12*	11.86*	17.35*	23.18*
	3.63	4.28	5.77	6.58	7.42	8.29	10.08	11.00*	12.91*	18.94*	25.35*
100	1.75	1.90	2.26	2.44	2.62	2.80	3.16	3.35*	3.74*	4.89*	6.04*
	2.11	2.31	2.76	2.99	3.22	3.45	3.92	4.17*	4.69*	6.26*	7.89*
	2.61	2.87	3.47	3.79	4.11	4.44	5.11	5.46*	6.21*	8.56*	11.05*
	2.98	3.30	4.05	4.44	4.84	5.26	6.13	6.58*	7.55*	10.61*	13.85*
	3.29	3.67	4.55	5.02	5.51	6.01	7.07	7.62*	8.79*	12.50*	16.44*
	3.81	4.31	5.45	6.07	6.72	7.39	8.80	9.54*	11.09*	15.99*	21.21*
	4.04	4.59	5.86	6.56	7.29	8.04	9.62	10.45*	12.17*	17.63*	23.44*
	4.26	4.86	6.27	7.03	7.83	8.67	10.41	11.32*	13.22*	19.22*	25.60*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 m (RADIUS = 2.8 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	1.93	2.09	2.47	2.66	2.86	3.04	3.42	3.61*	4.02*	5.22*	6.41*
	10	2.34	2.55	3.03	3.27	3.51	3.75	4.24	4.49*	5.02*	6.64*	8.28*
	20	2.90	3.18	3.81	4.13	4.46	4.79	5.47	5.82*	6.58*	8.93*	11.40*
	30	3.32	3.65	4.42	4.82	5.22	5.64	6.50	6.95*	7.91*	10.95*	14.17*
	40	3.66	4.05	4.95	5.42	5.90	6.40	7.43	7.98*	9.14*	12.82*	16.74*
	60	4.24	4.74	5.88	6.49	7.12	7.77	9.15	9.88*	11.41*	16.29*	21.49*
	70	4.49	5.04	6.30	6.98	7.68	8.42	9.96	10.77*	12.48*	17.92*	23.71*
	80	4.73	5.33	6.70	7.45	8.23	9.04	10.74	11.64*	13.52*	19.49*	25.86*
200	5	2.07	2.25	2.64	2.84	3.04	3.24	3.63	3.83*	4.26*	5.51*	6.72*
	10	2.53	2.75	3.25	3.50	3.75	4.00	4.50	4.75*	5.31*	6.97*	8.63*
	20	3.14	3.43	4.08	4.42	4.75	5.09	5.78	6.14*	6.91*	9.28*	11.74*
	30	3.59	3.94	4.73	5.14	5.55	5.97	6.83	7.28*	8.25*	11.29*	14.49*
	40	3.97	4.37	5.29	5.76	6.25	6.74	7.77	8.31*	9.48*	13.14*	17.05*
	60	4.59	5.10	6.25	6.86	7.48	8.13	9.48	10.20*	11.73*	16.58*	21.76*
	70	4.86	5.42	6.68	7.35	8.05	8.77	10.29	11.09*	12.79*	18.20*	23.98*
	80	5.12	5.72	7.09	7.83	8.60	9.39	11.06	11.95*	13.82*	19.77*	26.12*
250	5	2.20	2.38	2.79	3.00	3.21	3.41	3.81	4.02*	4.46*	5.75*	7.00*
	10	2.69	2.92	3.43	3.70	3.96	4.21	4.73	4.99*	5.56*	7.26*	8.95*
	20	3.35	3.65	4.32	4.67	5.01	5.36	6.05	6.42*	7.21*	9.60*	12.07*
	30	3.83	4.19	5.00	5.42	5.84	6.26	7.13	7.58*	8.57*	11.61*	14.81*
	40	4.23	4.65	5.58	6.06	6.56	7.06	8.08	8.62*	9.80*	13.46*	17.34*
	60	4.90	5.41	6.58	7.19	7.82	8.46	9.80	10.51*	12.04*	16.87*	22.03*
	70	5.18	5.75	7.02	7.70	8.39	9.11	10.60	11.40*	13.09*	18.48*	24.24*
	80	5.45	6.06	7.44	8.18	8.94	9.73	11.38	12.25*	14.12*	20.04*	26.37*
300	5	2.31	2.49	2.92	3.14	3.35	3.56	3.97	4.18*	4.64*	5.97*	7.25*
	10	2.83	3.07	3.60	3.87	4.14	4.40	4.93	5.20*	5.79*	7.53*	9.25*
	20	3.53	3.84	4.53	4.89	5.24	5.59	6.30	6.67*	7.48*	9.90*	12.39*
	30	4.04	4.41	5.24	5.67	6.10	6.53	7.40	7.86*	8.86*	11.92*	15.12*
	40	4.47	4.89	5.85	6.34	6.84	7.34	8.37	8.92*	10.09*	13.76*	17.64*
	60	5.17	5.69	6.87	7.49	8.12	8.77	10.10	10.81*	12.34*	17.16*	22.31*
	70	5.47	6.04	7.33	8.01	8.71	9.42	10.91	11.69*	13.39*	18.76*	24.50*
	80	5.75	6.37	7.76	8.50	9.26	10.04	11.68	12.55*	14.41*	20.31*	26.63*
400	5	2.49	2.69	3.15	3.37	3.60	3.82	4.25	4.48*	4.96*	6.36*	7.70*
	10	3.07	3.32	3.89	4.17	4.46	4.73	5.28	5.57*	6.19*	8.00*	9.78*
	20	3.84	4.17	4.90	5.27	5.64	6.01	6.74	7.13*	7.96*	10.46*	12.98*
	30	4.41	4.79	5.67	6.11	6.55	7.00	7.89	8.36*	9.39*	12.50*	15.71*
	40	4.87	5.31	6.31	6.82	7.33	7.85	8.90	9.45*	10.65*	14.34*	18.22*
	60	5.63	6.18	7.40	8.03	8.67	9.32	10.66	11.37*	12.91*	17.72*	22.85*
	70	5.96	6.55	7.88	8.57	9.27	9.99	11.47	12.26*	13.96*	19.31*	25.03*
	80	6.26	6.90	8.33	9.08	9.84	10.63	12.25	13.11*	14.97*	20.85*	27.14*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 m (RADIUS = 2.8 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX
 TEMPERATURE RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
0	5	1.31	1.59	2.19	2.49	2.79	3.10	3.72	4.04	4.67	6.64	8.67
	10	1.66	2.08	2.94	3.38	3.82	4.27	5.18	5.64	6.58	9.50	12.56
	20	2.25	2.90	4.21	4.87	5.55	6.23	7.62	8.34	9.78	14.32	19.11
	30	2.76	3.62	5.32	6.18	7.06	7.95	9.77	10.70	12.59	18.55	24.85
	40	3.24	4.29	6.34	7.39	8.45	9.53	11.74	12.87	15.17	22.43	30.12
	60	4.11	5.50	8.21	9.59	11.00	12.42	15.35	16.84	19.90	29.54	39.78
	70	4.51	6.07	9.09	10.63	12.19	13.78	17.03	18.70	22.11	32.86	44.29
	80	4.90	6.61	9.93	11.62	13.34	15.08	18.66	20.49	24.24	36.06	48.64
10	5	1.65	1.87	2.39	2.67	2.96	3.25	3.86	4.17	4.80	6.75	8.78
	10	2.00	2.34	3.12	3.53	3.96	4.40	5.29	5.75	6.68	9.60	12.65
	20	2.57	3.13	4.36	5.01	5.67	6.34	7.72	8.43	9.87	14.40	19.19
	30	3.06	3.83	5.46	6.30	7.17	8.05	9.86	10.78	12.67	18.62	24.92
	40	3.51	4.47	6.47	7.50	8.55	9.62	11.82	12.95	15.25	22.50	30.19
	60	4.36	5.67	8.33	9.70	11.09	12.51	15.42	16.91	19.97	29.60	39.83
	70	4.75	6.23	9.20	10.72	12.28	13.86	17.10	18.77	22.17	32.92	44.34
	80	5.14	6.77	10.04	11.71	13.42	15.16	18.73	20.56	24.30	36.12	48.70
20	5	1.85	2.06	2.57	2.84	3.12	3.40	3.99	4.29	4.92	6.86	8.88
	10	2.24	2.55	3.29	3.69	4.10	4.53	5.40	5.86	6.79	9.69	12.74
	20	2.83	3.33	4.51	5.14	5.79	6.45	7.82	8.52	9.96	14.48	19.26
	30	3.32	4.02	5.59	6.42	7.28	8.15	9.94	10.86	12.75	18.69	24.99
	40	3.77	4.66	6.60	7.61	8.65	9.72	11.90	13.02	15.32	22.56	30.25
	60	4.60	5.84	8.44	9.80	11.18	12.59	15.49	16.98	20.03	29.66	39.89
	70	4.99	6.39	9.31	10.82	12.36	13.94	17.17	18.83	22.23	32.97	44.40
	80	5.36	6.93	10.15	11.81	13.51	15.24	18.79	20.62	24.36	36.17	48.75
50	5	2.21	2.44	2.96	3.23	3.50	3.78	4.35	4.64	5.27	7.19	9.18
	10	2.69	3.00	3.72	4.10	4.49	4.89	5.73	6.17	7.09	9.97	13.00
	20	3.38	3.84	4.93	5.52	6.14	6.77	8.10	8.79	10.22	14.72	19.48
	30	3.92	4.54	5.99	6.78	7.60	8.44	10.20	11.11	12.99	18.91	25.18
	40	4.40	5.17	6.97	7.94	8.95	9.99	12.14	13.25	15.54	22.76	30.43
	60	5.24	6.33	8.79	10.10	11.45	12.84	15.71	17.19	20.23	29.84	40.06
	70	5.63	6.87	9.64	11.11	12.63	14.18	17.38	19.03	22.43	33.15	44.56
	80	6.00	7.39	10.47	12.09	13.76	15.47	19.00	20.81	24.55	36.34	48.90
100	5	2.59	2.83	3.39	3.67	3.96	4.25	4.82	5.12	5.76	7.69	9.68
	10	3.18	3.50	4.24	4.62	5.01	5.41	6.23	6.66	7.57	10.42	13.43
	20	3.99	4.45	5.52	6.09	6.68	7.29	8.56	9.23	10.64	15.11	19.84
	30	4.61	5.21	6.59	7.33	8.12	8.93	10.62	11.51	13.38	19.26	25.51
	40	5.14	5.87	7.56	8.48	9.44	10.45	12.54	13.63	15.90	23.09	30.74
	60	6.05	7.04	9.34	10.59	11.90	13.26	16.07	17.53	20.56	30.14	40.34
	70	6.47	7.58	10.18	11.59	13.06	14.58	17.73	19.36	22.74	33.43	44.83
	80	6.85	8.10	10.99	12.56	14.18	15.86	19.34	21.14	24.85	36.62	49.16

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 m (RADIUS = 2.8 m^3)
FIRE GROWTH: SLOW (ALPHA = $.00293 \text{ kJ/s}^3$)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 (m*s) ^{1/2}	°C												
	5	2.87	3.12	3.71	4.00	4.30	4.60	5.19	5.50*	6.16*	8.13*	10.14*	
	10	3.53	3.86	4.63	5.03	5.43	5.84	6.66	7.09*	8.01*	10.86*	13.85*	
	20	4.43	4.91	5.99	6.56	7.15	7.75	8.99	9.65*	11.06*	15.49*	20.20*	
	30	5.12	5.72	7.09	7.83	8.59	9.38	11.04	11.91*	13.76*	19.61*	25.84*	
	40	5.70	6.42	8.08	8.98	9.91	10.89	12.93	14.00*	16.26*	23.42*	31.05*	
	60	6.68	7.64	9.86	11.07	12.34	13.66	16.43	17.87*	20.89*	30.43*	40.61*	
	70	7.12	8.20	10.69	12.06	13.49	14.97	18.08	19.69*	23.06*	33.72*	45.09*	
	80	7.53	8.73	11.49	13.01	14.60	16.24	19.67	21.45*	25.16*	36.90*	49.42*	
200	5	3.09	3.35	3.97	4.28	4.59	4.89	5.51	5.82*	6.50*	8.52*	10.55*	
	10	3.81	4.16	4.96	5.37	5.78	6.19	7.03	7.46*	8.40*	11.27*	14.26*	
	20	4.80	5.29	6.39	6.97	7.56	8.16	9.40	10.05*	11.46*	15.87*	20.56*	
	30	5.54	6.15	7.54	8.27	9.03	9.81	11.44	12.30*	14.14*	19.96*	26.17*	
	40	6.16	6.89	8.54	9.43	10.35	11.31	13.31	14.37*	16.62*	23.75*	31.35*	
	60	7.21	8.16	10.34	11.53	12.77	14.07	16.78	18.21*	21.21*	30.73*	40.89*	
	70	7.67	8.73	11.17	12.51	13.91	15.36	18.42	20.02*	23.37*	34.01*	45.36*	
	80	8.10	9.27	11.97	13.45	15.01	16.62	20.00	21.77*	25.46*	37.18*	49.68*	
250	5	3.28	3.55	4.19	4.51	4.83	5.15	5.78	6.10*	6.80*	8.87*	10.94*	
	10	4.06	4.42	5.25	5.67	6.09	6.51	7.36	7.80*	8.75*	11.66*	14.65*	
	20	5.11	5.61	6.74	7.33	7.92	8.53	9.77	10.42*	11.83*	16.24*	20.92*	
	30	5.90	6.52	7.93	8.66	9.42	10.20	11.81	12.67*	14.50*	20.30*	26.50*	
	40	6.56	7.29	8.96	9.85	10.76	11.71	13.69	14.73*	16.97*	24.07*	31.66*	
	60	7.66	8.61	10.79	11.96	13.18	14.46	17.13	18.55*	21.54*	31.03*	41.17*	
	70	8.15	9.20	11.62	12.94	14.31	15.75	18.76	20.35*	23.69*	34.29*	45.63*	
	80	8.60	9.76	12.43	13.88	15.41	16.99	20.33	22.09*	25.77*	37.45*	49.94*	
300	5	3.45	3.73	4.39	4.72	5.05	5.37	6.02	6.35*	7.07*	9.19*	11.29*	
	10	4.28	4.65	5.50	5.93	6.36	6.79	7.65	8.10*	9.08*	12.02*	15.03*	
	20	5.39	5.90	7.06	7.65	8.26	8.87	10.11	10.77*	12.19*	16.61*	21.27*	
	30	6.22	6.85	8.28	9.02	9.79	10.56	12.17	13.03*	14.86*	20.65*	26.82*	
	40	6.91	7.66	9.34	10.23	11.14	12.08	14.04	15.09*	17.32*	24.39*	31.96*	
	60	8.07	9.02	11.20	12.36	13.57	14.83	17.48	18.88*	21.86*	31.32*	41.44*	
	70	8.57	9.63	12.04	13.34	14.70	16.12	19.10	20.67*	24.00*	34.58*	45.89*	
	80	9.04	10.20	12.85	14.29	15.79	17.36	20.66	22.40*	26.07*	37.73*	50.20*	
400	5	3.74	4.04	4.73	5.08	5.43	5.77	6.44	6.79*	7.54*	9.75*	11.92*	
	10	4.65	5.04	5.93	6.39	6.84	7.28	8.18	8.64*	9.65*	12.68*	15.73*	
	20	5.87	6.41	7.61	8.23	8.85	9.47	10.74	11.40*	12.85*	17.30*	21.96*	
	30	6.78	7.43	8.90	9.67	10.44	11.22	12.84	13.69*	15.54*	21.32*	27.46*	
	40	7.53	8.29	10.01	10.91	11.83	12.77	14.72	15.76*	17.99*	25.03*	32.56*	
	60	8.77	9.75	11.94	13.10	14.30	15.55	18.15	19.53*	22.49*	31.91*	41.99*	
	70	9.31	10.39	12.81	14.10	15.44	16.83	19.75	21.31*	24.61*	35.14*	46.42*	
	80	9.82	10.99	13.63	15.05	16.53	18.07	21.31	23.02*	26.67*	38.28*	50.71*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.5 m (RADIUS = 3.2 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX
TEMPERATURE RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	0	1	2	4	5	6	7	9	10	12	18	24
5	0.45	0.51	0.64	0.71	0.78	0.85	0.99	1.06	1.20*	1.26*	1.62*	2.03*
10	0.50	0.57	0.74	0.83	0.92	1.00	1.18	1.27	1.45*	1.56*	1.98*	2.53*
20	0.58	0.68	0.91	1.03	1.14	1.26	1.50	1.62	1.86*	2.03*	2.60*	3.37*
30	0.65	0.78	1.06	1.20	1.34	1.49	1.78	1.93	2.22*	2.42*	3.14*	4.10*
40	0.72	0.87	1.20	1.36	1.53	1.69	2.04	2.21	2.56*	2.82*	3.64*	4.77*
60	0.84	1.04	1.45	1.65	1.86	2.07	2.51	2.72	3.17*	3.46*	4.55*	6.00*
70	0.89	1.11	1.56	1.79	2.02	2.25	2.73	2.97	3.46*	3.77*	4.98*	6.58*
80	0.95	1.19	1.68	1.92	2.17	2.42	2.94	3.20	3.73*	4.04*	5.39*	7.13*
10	0.60	0.65	0.78	0.85	0.91	0.98	1.11	1.18	1.31*	1.40*	1.72*	2.14*
5	0.68	0.74	0.89	0.97	1.05	1.13	1.29	1.38	1.55*	1.64*	2.08*	2.62*
10	0.78	0.86	1.05	1.16	1.26	1.37	1.60	1.71	1.95*	2.03*	2.68*	3.44*
20	0.86	0.96	1.19	1.32	1.45	1.59	1.87	2.01	2.30*	2.38*	3.22*	4.16*
30	0.93	1.05	1.32	1.48	1.63	1.79	2.12	2.29	2.63*	2.70*	3.71*	4.83*
40	1.05	1.20	1.56	1.76	1.96	2.16	2.58	2.80	3.24*	3.30*	4.61*	6.06*
60	1.11	1.28	1.68	1.89	2.11	2.34	2.80	3.03	3.52*	3.58*	5.04*	6.63*
70	1.16	1.35	1.79	2.02	2.26	2.50	3.01	3.27	3.79*	3.85*	5.45*	7.19*
80	0.66	0.72	0.85	0.92	0.99	1.05	1.19	1.26	1.40*	1.46*	1.81*	2.23*
5	0.76	0.82	0.97	1.05	1.14	1.22	1.38	1.46	1.64*	1.71*	2.16*	2.70*
10	0.88	0.96	1.16	1.26	1.36	1.47	1.69	1.80	2.03*	2.09*	2.76*	3.51*
20	0.98	1.07	1.30	1.43	1.55	1.68	1.95	2.09	2.38*	2.43*	3.29*	4.23*
30	1.06	1.17	1.44	1.58	1.73	1.88	2.20	2.36	2.70*	2.75*	3.77*	4.89*
40	1.19	1.33	1.67	1.86	2.05	2.25	2.66	2.87	3.30*	3.35*	4.67*	6.11*
60	1.25	1.41	1.78	1.99	2.20	2.42	2.87	3.10	3.58*	3.63*	5.09*	6.69*
70	1.31	1.48	1.89	2.11	2.35	2.58	3.08	3.33	3.85*	3.90*	5.50*	7.24*
80	0.78	0.83	0.98	1.05	1.12	1.20	1.34	1.42	1.56*	1.61*	2.01*	2.44*
5	0.90	0.97	1.14	1.22	1.31	1.40	1.57	1.66	1.83*	1.88*	2.38*	2.93*
10	1.06	1.15	1.36	1.47	1.57	1.68	1.90	2.01	2.25*	2.30*	2.98*	3.72*
20	1.19	1.29	1.53	1.66	1.78	1.91	2.18	2.31	2.59*	2.64*	3.49*	4.42*
30	1.29	1.40	1.68	1.82	1.97	2.12	2.42	2.58	2.91*	2.96*	3.97*	5.08*
40	1.46	1.60	1.93	2.11	2.29	2.48	2.87	3.07	3.49*	3.54*	4.85*	6.28*
60	1.53	1.68	2.05	2.24	2.44	2.65	3.08	3.30	3.77*	3.82*	5.27*	6.84*
70	1.60	1.77	2.16	2.37	2.59	2.81	3.28	3.52	4.04*	4.09*	5.67*	7.39*
80	0.89	0.95	1.11	1.19	1.27	1.35	1.51	1.58	1.74*	1.79*	2.23*	2.69*
5	1.05	1.12	1.31	1.40	1.50	1.59	1.77	1.87	2.06*	2.11*	2.65*	3.22*
10	1.25	1.35	1.57	1.69	1.81	1.92	2.15	2.27	2.51*	2.56*	3.27*	4.03*
20	1.41	1.51	1.78	1.91	2.05	2.18	2.45	2.59	2.88*	2.93*	3.80*	4.73*
30	1.53	1.65	1.95	2.10	2.25	2.40	2.72	2.87	3.21*	3.26*	4.27*	5.37*
40	1.74	1.89	2.24	2.42	2.60	2.79	3.18	3.37	3.79*	3.84*	5.14*	6.55*
60	1.83	1.99	2.36	2.56	2.76	2.97	3.39	3.60	4.06*	4.11*	5.54*	7.11*
70	1.83	1.99	2.36	2.56	2.76	2.97	3.39	3.60	4.06*	4.11*	5.54*	7.11*
80	1.91	2.08	2.48	2.70	2.91	3.13	3.59	3.82	4.32*	4.37*	5.94*	7.65*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.5 m (RADIUS = 3.2 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 150	5	0.97	1.04	1.20	1.29	1.38	1.46	1.62	1.70	1.87*	2.38*	2.87*	
	10	1.15	1.23	1.43	1.53	1.63	1.73	1.92	2.02	2.22*	2.84*	3.44*	
	20	1.39	1.49	1.73	1.85	1.98	2.10	2.34	2.46	2.72*	3.51*	4.30*	
	30	1.56	1.68	1.96	2.10	2.24	2.38	2.67	2.81	3.11*	4.05*	5.00*	
	40	1.71	1.84	2.15	2.31	2.46	2.62	2.94	3.11	3.45*	4.53*	5.64*	
	60	1.94	2.10	2.46	2.65	2.84	3.04	3.43	3.62	4.05*	5.40*	6.81*	
	70	2.04	2.21	2.60	2.81	3.01	3.22	3.64	3.86	4.32*	5.81*	7.36*	
	80	2.13	2.31	2.73	2.95	3.17	3.39	3.85	4.09	4.59*	6.20*	7.90*	
200	5	1.04	1.11	1.28	1.37	1.46	1.55	1.72	1.80	1.98*	2.51*	3.02*	
	10	1.24	1.32	1.53	1.63	1.74	1.84	2.05	2.15	2.36*	3.01*	3.63*	
	20	1.50	1.61	1.86	1.99	2.12	2.25	2.50	2.62	2.89*	3.71*	4.52*	
	30	1.69	1.81	2.11	2.25	2.40	2.55	2.84	2.99	3.30*	4.28*	5.25*	
	40	1.85	1.99	2.31	2.48	2.64	2.81	3.14	3.30	3.66*	4.77*	5.89*	
	60	2.11	2.27	2.65	2.85	3.04	3.24	3.64	3.84	4.27*	5.65*	7.06*	
	70	2.22	2.39	2.80	3.01	3.22	3.44	3.87	4.09	4.55*	6.05*	7.61*	
	80	2.32	2.50	2.94	3.16	3.39	3.62	4.08	4.32	4.82*	6.44*	8.14*	
250	5	1.09	1.17	1.35	1.44	1.53	1.62	1.80	1.89	2.07*	2.63*	3.15*	
	10	1.31	1.40	1.61	1.72	1.83	1.94	2.15	2.26	2.48*	3.15*	3.79*	
	20	1.59	1.70	1.97	2.10	2.24	2.37	2.63	2.76	3.04*	3.89*	4.72*	
	30	1.80	1.93	2.23	2.39	2.54	2.69	3.00	3.15	3.47*	4.47*	5.46*	
	40	1.97	2.11	2.45	2.62	2.79	2.96	3.31	3.47	3.84*	4.98*	6.12*	
	60	2.25	2.42	2.81	3.01	3.22	3.42	3.83	4.03	4.47*	5.87*	7.30*	
	70	2.36	2.55	2.97	3.19	3.40	3.62	4.06	4.29	4.76*	6.28*	7.85*	
	80	2.47	2.67	3.11	3.35	3.58	3.81	4.28	4.52	5.03*	6.68*	8.38*	
300	5	1.14	1.22	1.41	1.50	1.60	1.69	1.87	1.96	2.15*	2.73*	3.27*	
	10	1.37	1.47	1.69	1.80	1.92	2.03	2.25	2.35	2.58*	3.28*	3.94*	
	20	1.68	1.79	2.07	2.21	2.34	2.48	2.75	2.88	3.17*	4.05*	4.90*	
	30	1.90	2.03	2.34	2.50	2.66	2.82	3.13	3.29	3.62*	4.65*	5.66*	
	40	2.08	2.23	2.57	2.75	2.93	3.11	3.45	3.63	4.00*	5.17*	6.33*	
	60	2.37	2.55	2.96	3.16	3.37	3.58	4.00	4.21	4.66*	6.08*	7.52*	
	70	2.50	2.68	3.12	3.34	3.57	3.79	4.24	4.47	4.95*	6.50*	8.07*	
	80	2.61	2.81	3.27	3.51	3.75	3.99	4.47	4.71	5.23*	6.89*	8.60*	
400	5	1.23	1.31	1.51	1.61	1.71	1.81	2.00	2.09	2.29*	2.90*	3.47*	
	10	1.49	1.58	1.82	1.94	2.06	2.18	2.41	2.52	2.76*	3.49*	4.19*	
	20	1.82	1.94	2.23	2.38	2.53	2.67	2.96	3.10	3.40*	4.32*	5.22*	
	30	2.07	2.21	2.54	2.71	2.88	3.04	3.37	3.53	3.88*	4.96*	6.02*	
	40	2.26	2.42	2.79	2.98	3.16	3.35	3.72	3.90	4.29*	5.51*	6.71*	
	60	2.59	2.77	3.20	3.42	3.64	3.86	4.30	4.51	4.98*	6.46*	7.93*	
	70	2.72	2.92	3.38	3.62	3.85	4.09	4.55	4.78	5.29*	6.88*	8.49*	
	80	2.85	3.06	3.55	3.80	4.05	4.29	4.79	5.04	5.58*	7.29*	9.02*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.5 m (RADIUS = 3.2 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	5	0.64	0.73	0.95	1.06	1.17	1.28	1.50	1.61	1.83*	2.50*	3.18*	
	10	0.74	0.87	1.15	1.29	1.44	1.58	1.88	2.02	2.32*	3.24*	4.17*	
	20	0.90	1.09	1.49	1.69	1.89	2.10	2.51	2.72	3.15*	4.47*	5.84*	
	30	1.04	1.29	1.78	2.04	2.29	2.55	3.07	3.34	3.88*	5.56*	7.31*	
	40	1.17	1.47	2.06	2.36	2.66	2.96	3.59	3.90	4.55*	6.55*	8.65*	
	60	1.41	1.80	2.56	2.94	3.33	3.72	4.53	4.94	5.77*	8.37*	11.12*	
	70	1.52	1.95	2.79	3.21	3.64	4.08	4.97	5.42	6.34*	9.23*	12.27*	
	80	1.63	2.10	3.01	3.48	3.95	4.42	5.39	5.88	6.89*	10.05*	13.38*	
10	5	0.86	0.93	1.12	1.22	1.32	1.42	1.63	1.73	1.95*	2.61*	3.28*	
	10	0.98	1.08	1.32	1.45	1.58	1.71	1.99	2.13	2.42*	3.33*	4.26*	
	20	1.16	1.30	1.64	1.82	2.01	2.21	2.61	2.82	3.24*	4.55*	5.92*	
	30	1.30	1.48	1.92	2.16	2.40	2.65	3.16	3.42	3.96*	5.63*	7.37*	
	40	1.43	1.66	2.19	2.47	2.76	3.06	3.67	3.98	4.62*	6.62*	8.71*	
	60	1.66	1.97	2.67	3.05	3.42	3.81	4.60	5.01	5.84*	8.43*	11.17*	
	70	1.76	2.12	2.90	3.31	3.73	4.16	5.04	5.49	6.40*	9.28*	12.32*	
	80	1.87	2.26	3.13	3.58	4.03	4.50	5.46	5.95	6.95*	10.10*	13.43*	
20	5	0.95	1.03	1.22	1.32	1.43	1.53	1.74	1.84	2.05*	2.72*	3.38*	
	10	1.10	1.20	1.44	1.57	1.70	1.83	2.10	2.24	2.52*	3.42*	4.35*	
	20	1.31	1.44	1.77	1.95	2.13	2.32	2.71	2.91	3.32*	4.63*	5.99*	
	30	1.47	1.64	2.05	2.28	2.51	2.75	3.25	3.51	4.04*	5.70*	7.44*	
	40	1.61	1.81	2.31	2.58	2.87	3.15	3.75	4.06	4.69*	6.68*	8.78*	
	60	1.85	2.13	2.79	3.15	3.52	3.90	4.68	5.08	5.90*	8.49*	11.23*	
	70	1.96	2.28	3.02	3.41	3.82	4.25	5.11	5.56	6.47*	9.34*	12.37*	
	80	2.06	2.42	3.23	3.67	4.12	4.58	5.53	6.02	7.02*	10.16*	13.48*	
50	5	1.12	1.20	1.42	1.52	1.63	1.74	1.96	2.07	2.29*	2.97*	3.65*	
	10	1.31	1.42	1.68	1.81	1.95	2.08	2.36	2.49	2.78*	3.68*	4.60*	
	20	1.58	1.72	2.06	2.24	2.42	2.60	2.97	3.17	3.57*	4.86*	6.21*	
	30	1.78	1.95	2.36	2.58	2.80	3.03	3.51	3.75	4.26*	5.91*	7.64*	
	40	1.95	2.15	2.63	2.89	3.15	3.43	3.99	4.29	4.91*	6.88*	8.96*	
	60	2.24	2.50	3.11	3.44	3.79	4.15	4.90	5.29	6.10*	8.67*	11.39*	
	70	2.36	2.65	3.33	3.70	4.09	4.49	5.33	5.76	6.66*	9.51*	12.54*	
	80	2.48	2.80	3.55	3.95	4.38	4.82	5.74	6.21	7.20*	10.33*	13.64*	
100	5	1.29	1.39	1.62	1.74	1.85	1.97	2.20	2.32	2.56*	3.29*	4.00*	
	10	1.54	1.65	1.94	2.08	2.22	2.37	2.65	2.80	3.10*	4.03*	4.97*	
	20	1.87	2.02	2.38	2.57	2.75	2.94	3.32	3.51	3.92*	5.22*	6.56*	
	30	2.12	2.30	2.72	2.95	3.17	3.40	3.87	4.11	4.62*	6.25*	7.96*	
	40	2.32	2.53	3.02	3.28	3.54	3.81	4.36	4.65	5.25*	7.20*	9.26*	
	60	2.66	2.92	3.53	3.85	4.19	4.53	5.25	5.63	6.42*	8.97*	11.67*	
	70	2.80	3.09	3.76	4.12	4.49	4.87	5.67	6.09	6.97*	9.80*	12.80*	
	80	2.94	3.25	3.98	4.37	4.78	5.20	6.08	6.54	7.50*	10.60*	13.89*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.5 m (RADIUS = 3.2 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	1.42	1.52	1.76	1.89	2.01	2.14	2.38	2.50	2.75*	3.52*	4.26*
	10	1.70	1.82	2.12	2.28	2.43	2.58	2.88	3.03	3.34*	4.32*	5.28*
	20	2.08	2.24	2.62	2.81	3.01	3.20	3.59	3.79	4.21*	5.53*	6.88*
	30	2.36	2.55	2.99	3.22	3.46	3.69	4.17	4.41	4.92*	6.57*	8.27*
	40	2.59	2.80	3.31	3.58	3.85	4.12	4.67	4.96	5.56*	7.51*	9.56*
	60	2.97	3.23	3.86	4.19	4.52	4.87	5.58	5.94	6.72*	9.26*	11.94*
	70	3.13	3.42	4.10	4.46	4.83	5.21	5.99	6.40	7.27*	10.08*	13.06*
	80	3.28	3.60	4.33	4.72	5.12	5.54	6.40	6.84	7.79*	10.87*	14.15*
200	5	1.52	1.62	1.88	2.01	2.14	2.27	2.53	2.65	2.91*	3.72*	4.49*
	10	1.83	1.96	2.28	2.44	2.59	2.75	3.06	3.22	3.54*	4.56*	5.55*
	20	2.25	2.41	2.81	3.01	3.22	3.42	3.82	4.03	4.46*	5.81*	7.18*
	30	2.55	2.75	3.22	3.46	3.70	3.94	4.42	4.67	5.19*	6.86*	8.57*
	40	2.80	3.03	3.56	3.83	4.11	4.38	4.95	5.23	5.84*	7.80*	9.85*
	60	3.22	3.49	4.13	4.47	4.81	5.16	5.87	6.23	7.01*	9.54*	12.21*
	70	3.39	3.69	4.39	4.75	5.13	5.51	6.29	6.69	7.55*	10.35*	13.33*
	80	3.56	3.88	4.63	5.02	5.43	5.84	6.69	7.13	8.08*	11.14*	14.40*
250	5	1.61	1.72	1.98	2.12	2.26	2.39	2.65	2.78	3.05*	3.89*	4.68*
	10	1.95	2.08	2.41	2.57	2.74	2.90	3.22	3.38	3.72*	4.77*	5.78*
	20	2.39	2.57	2.98	3.19	3.40	3.61	4.02	4.23	4.67*	6.06*	7.45*
	30	2.72	2.93	3.41	3.66	3.90	4.15	4.65	4.90	5.43*	7.13*	8.85*
	40	2.99	3.22	3.77	4.05	4.33	4.62	5.19	5.48	6.10*	8.08*	10.13*
	60	3.43	3.72	4.38	4.72	5.06	5.41	6.13	6.49	7.28*	9.81*	12.48*
	70	3.62	3.93	4.64	5.01	5.39	5.77	6.56	6.96	7.82*	10.62*	13.58*
	80	3.80	4.13	4.89	5.29	5.70	6.11	6.97	7.40	8.35*	11.41*	14.66*
300	5	1.68	1.80	2.07	2.21	2.35	2.49	2.76	2.90	3.18*	4.04*	4.86*
	10	2.04	2.18	2.52	2.69	2.86	3.03	3.36	3.53	3.88*	4.95*	6.00*
	20	2.52	2.70	3.13	3.34	3.56	3.77	4.20	4.41	4.87*	6.29*	7.70*
	30	2.87	3.08	3.58	3.83	4.09	4.34	4.85	5.10	5.65*	7.37*	9.12*
	40	3.16	3.40	3.96	4.24	4.53	4.82	5.41	5.70	6.33*	8.34*	10.40*
	60	3.62	3.91	4.59	4.94	5.29	5.65	6.37	6.74	7.53*	10.07*	12.74*
	70	3.82	4.14	4.87	5.25	5.63	6.02	6.80	7.21	8.07*	10.88*	13.84*
	80	4.01	4.35	5.13	5.53	5.95	6.36	7.22	7.66	8.60*	11.66*	14.90*
400	5	1.82	1.94	2.23	2.38	2.52	2.67	2.95	3.09	3.39*	4.30*	5.16*
	10	2.22	2.36	2.72	2.90	3.08	3.26	3.61	3.78	4.15*	5.28*	6.37*
	20	2.74	2.93	3.38	3.61	3.84	4.07	4.51	4.73	5.21*	6.69*	8.15*
	30	3.13	3.35	3.87	4.14	4.41	4.67	5.20	5.46	6.03*	7.82*	9.60*
	40	3.44	3.69	4.28	4.58	4.89	5.19	5.79	6.09	6.74*	8.81*	10.90*
	60	3.95	4.26	4.96	5.33	5.69	6.06	6.80	7.17	7.98*	10.56*	13.24*
	70	4.17	4.50	5.26	5.65	6.05	6.45	7.25	7.66	8.54*	11.38*	14.33*
	80	4.37	4.73	5.54	5.96	6.38	6.81	7.68	8.12	9.07*	12.16*	15.39*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.5 m (RADIUS = 3.2 m)³
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2} 0	5	0.94	1.10	1.45	1.63	1.81	1.99	2.35	2.54	2.91*	4.03*	5.19*
	10	1.14	1.37	1.85	2.10	2.35	2.60	3.11	3.37	3.89*	5.50*	7.17*
	20	1.46	1.82	2.53	2.89	3.26	3.63	4.39	4.77	5.55*	7.98*	10.51*
	30	1.75	2.21	3.12	3.59	4.06	4.54	5.51	6.00	7.00*	10.14*	13.44*
	40	2.01	2.57	3.67	4.23	4.79	5.37	6.53	7.13	8.34*	12.13*	16.13*
	60	2.48	3.23	4.67	5.40	6.14	6.88	8.41	9.19	10.79*	15.78*	21.06*
	70	2.71	3.53	5.14	5.94	6.76	7.59	9.29	10.16	11.93*	17.48*	23.36*
	80	2.92	3.83	5.59	6.47	7.37	8.28	10.14	11.09	13.03*	19.13*	25.58*
10	5	1.23	1.35	1.65	1.81	1.98	2.15	2.49	2.67	3.03*	4.14*	5.29*
	10	1.44	1.61	2.03	2.26	2.50	2.74	3.23	3.48	3.99*	5.60*	7.26*
	20	1.76	2.04	2.69	3.03	3.39	3.75	4.49	4.86	5.64*	8.05*	10.59*
	30	2.04	2.41	3.27	3.71	4.17	4.64	5.60	6.08	7.08*	10.21*	13.51*
	40	2.28	2.76	3.80	4.34	4.90	5.46	6.62	7.21	8.41*	12.20*	16.20*
	60	2.74	3.40	4.79	5.50	6.23	6.97	8.49	9.27	10.85*	15.84*	21.12*
	70	2.96	3.70	5.25	6.05	6.86	7.68	9.37	10.23	11.99*	17.54*	23.42*
	80	3.16	4.00	5.70	6.57	7.46	8.36	10.21	11.16	13.09*	19.18*	25.64*
20	5	1.37	1.49	1.80	1.96	2.12	2.28	2.62	2.79	3.15*	4.25*	5.39*
	10	1.62	1.78	2.19	2.41	2.63	2.87	3.34	3.59	4.10*	5.69*	7.35*
	20	1.98	2.23	2.84	3.17	3.51	3.86	4.58	4.96	5.72*	8.13*	10.66*
	30	2.26	2.60	3.40	3.84	4.28	4.74	5.68	6.17	7.16*	10.29*	13.58*
	40	2.52	2.94	3.93	4.46	5.00	5.56	6.70	7.29	8.49*	12.27*	16.26*
	60	2.97	3.57	4.91	5.61	6.33	7.06	8.57	9.34	10.92*	15.90*	21.17*
	70	3.19	3.87	5.36	6.15	6.95	7.76	9.44	10.30	12.06*	17.60*	23.47*
	80	3.39	4.16	5.81	6.67	7.55	8.44	10.28	11.23	13.15*	19.24*	25.69*
50	5	1.63	1.76	2.08	2.25	2.42	2.59	2.92	3.09	3.45*	4.56*	5.69*
	10	1.95	2.12	2.53	2.75	2.97	3.20	3.66	3.89	4.39*	5.96*	7.61*
	20	2.39	2.63	3.21	3.53	3.85	4.18	4.87	5.23	5.98*	8.37*	10.88*
	30	2.72	3.04	3.78	4.19	4.61	5.04	5.95	6.42	7.40*	10.50*	13.77*
	40	3.01	3.40	4.30	4.79	5.31	5.84	6.95	7.52	8.70*	12.46*	16.44*
	60	3.51	4.03	5.25	5.92	6.61	7.32	8.79	9.55	11.12*	16.08*	21.34*
	70	3.74	4.33	5.70	6.45	7.22	8.01	9.66	10.50	12.25*	17.77*	23.63*
	80	3.95	4.61	6.13	6.96	7.81	8.68	10.49	11.42	13.34*	19.41*	25.84*
100	5	1.90	2.04	2.39	2.57	2.75	2.92	3.28	3.46	3.83*	4.98*	6.13*
	10	2.29	2.47	2.91	3.14	3.37	3.61	4.07	4.31	4.81*	6.39*	8.02*
	20	2.82	3.08	3.67	3.99	4.31	4.64	5.31	5.65	6.39*	8.75*	11.24*
	30	3.22	3.54	4.28	4.68	5.08	5.50	6.37	6.82	7.78*	10.85*	14.10*
	40	3.56	3.94	4.82	5.29	5.78	6.29	7.35	7.90	9.06*	12.79*	16.75*
	60	4.13	4.62	5.78	6.40	7.06	7.74	9.16	9.90	11.44*	16.38*	21.62*
	70	4.38	4.93	6.22	6.92	7.66	8.42	10.01	10.84	12.56*	18.06*	23.90*
	80	4.62	5.23	6.65	7.42	8.24	9.08	10.84	11.75	13.64*	19.68*	26.10*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.5 m (RADIUS = 3.2 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

CEILING HEIGHT, m

RESPONSE TEMPERATURE
TIME INDEX RISE

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	2.09	2.24	2.61	2.80	2.99	3.17	3.55	3.73	4.12*	5.32*	6.50*
	10	2.54	2.73	3.20	3.44	3.68	3.92	4.40	4.64	5.15*	6.77*	8.41*
	20	3.14	3.40	4.02	4.35	4.67	5.01	5.68	6.02	6.76*	9.12*	11.59*
	30	3.59	3.92	4.67	5.07	5.48	5.90	6.75	7.20	8.14*	11.19*	14.43*
	40	3.97	4.35	5.24	5.71	6.19	6.69	7.73	8.27	9.41*	13.12*	17.05*
	60	4.59	5.08	6.22	6.84	7.48	8.14	9.52	10.24	11.77*	16.67*	21.89*
	70	4.87	5.41	6.68	7.36	8.07	8.81	10.36	11.17	12.87*	18.34*	24.16*
	80	5.12	5.72	7.11	7.86	8.65	9.46	11.18	12.07	13.95*	19.96*	26.36*
200	5	2.25	2.40	2.79	2.99	3.19	3.38	3.77	3.96	4.36*	5.60*	6.82*
	10	2.74	2.94	3.43	3.68	3.93	4.17	4.67	4.92	5.44*	7.10*	8.76*
	20	3.40	3.67	4.32	4.65	4.98	5.32	6.00	6.35	7.09*	9.47*	11.94*
	30	3.89	4.22	5.00	5.41	5.82	6.24	7.10	7.54	8.48*	11.53*	14.75*
	40	4.30	4.69	5.59	6.07	6.55	7.05	8.08	8.61	9.75*	13.44*	17.35*
	60	4.97	5.47	6.61	7.23	7.86	8.51	9.87	10.58	12.08*	16.96*	22.17*
	70	5.27	5.81	7.08	7.75	8.46	9.18	10.71	11.50	13.18*	18.63*	24.43*
	80	5.54	6.14	7.52	8.26	9.03	9.83	11.52	12.39	14.25*	20.23*	26.62*
250	5	2.38	2.54	2.95	3.15	3.35	3.56	3.95	4.15	4.57*	5.85*	7.10*
	10	2.91	3.12	3.63	3.88	4.14	4.40	4.91	5.16	5.70*	7.40*	9.09*
	20	3.62	3.90	4.57	4.91	5.25	5.60	6.29	6.64	7.39*	9.79*	12.27*
	30	4.15	4.49	5.29	5.70	6.12	6.55	7.41	7.85	8.80*	11.85*	15.06*
	40	4.58	4.98	5.90	6.39	6.88	7.38	8.41	8.94	10.07*	13.75*	17.65*
	60	5.30	5.80	6.96	7.57	8.20	8.85	10.20	10.90	12.39*	17.26*	22.44*
	70	5.61	6.16	7.44	8.11	8.81	9.53	11.03	11.82	13.49*	18.91*	24.69*
	80	5.90	6.50	7.89	8.62	9.39	10.18	11.84	12.71	14.54*	20.51*	26.87*
300	5	2.50	2.67	3.08	3.30	3.51	3.71	4.12	4.32	4.75*	6.08*	7.36*
	10	3.06	3.28	3.80	4.07	4.33	4.60	5.12	5.38	5.93*	7.67*	9.38*
	20	3.82	4.11	4.79	5.14	5.49	5.84	6.55	6.91	7.67*	10.10*	12.59*
	30	4.37	4.73	5.54	5.97	6.39	6.82	7.70	8.14	9.09*	12.16*	15.37*
	40	4.83	5.24	6.18	6.67	7.17	7.67	8.71	9.24	10.37*	14.06*	17.95*
	60	5.59	6.10	7.27	7.89	8.52	9.17	10.51	11.21	12.70*	17.54*	22.71*
	70	5.92	6.48	7.76	8.44	9.14	9.86	11.35	12.12	13.78*	19.19*	24.96*
	80	6.22	6.83	8.22	8.96	9.72	10.51	12.15	13.01	14.84*	20.78*	27.13*
400	5	2.70	2.88	3.32	3.54	3.77	3.98	4.41	4.63	5.08*	6.47*	7.80*
	10	3.33	3.56	4.11	4.39	4.67	4.94	5.49	5.76	6.34*	8.15*	9.92*
	20	4.16	4.46	5.18	5.54	5.91	6.28	7.01	7.37	8.16*	10.66*	13.18*
	30	4.77	5.13	5.99	6.43	6.87	7.31	8.21	8.66	9.63*	12.75*	15.97*
	40	5.27	5.69	6.67	7.18	7.69	8.20	9.25	9.78	10.93*	14.64*	18.53*
	60	6.09	6.62	7.83	8.46	9.10	9.75	11.09	11.78	13.27*	18.11*	23.25*
	70	6.45	7.02	8.34	9.03	9.73	10.45	11.94	12.70	14.35*	19.74*	25.48*
	80	6.78	7.40	8.82	9.57	10.33	11.12	12.75	13.59	15.40*	21.32*	27.64*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.5 m (RADIUS = 3.2 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE		CEILING HEIGHT, m										
(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24		
0	5	1.44	1.72	2.32	2.62	2.93	3.24	3.86	4.18	4.82*	6.79*	8.83*		
	10	1.82	2.25	3.12	3.56	4.01	4.46	5.38	5.84	6.79*	9.73*	12.80*		
	20	2.47	3.15	4.48	5.15	5.83	6.52	7.93	8.65	10.11*	14.67*	19.48*		
	30	3.04	3.93	5.66	6.54	7.43	8.33	10.17	11.11	13.02*	19.01*	25.34*		
	40	3.56	4.65	6.76	7.82	8.90	9.99	12.22	13.36	15.69*	22.99*	30.72*		
	60	4.52	5.97	8.75	10.16	11.58	13.03	15.98	17.49	20.58*	30.28*	40.57*		
	70	4.97	6.58	9.69	11.25	12.84	14.45	17.74	19.43	22.86*	33.69*	45.18*		
	80	5.40	7.18	10.59	12.31	14.05	15.82	19.44	21.29	25.07*	36.98*	49.62*		
10	5	1.80	2.01	2.53	2.81	3.10	3.40	4.00	4.31	4.94*	6.90*	8.93*		
	10	2.18	2.52	3.31	3.73	4.16	4.60	5.50	5.96	6.89*	9.82*	12.89*		
	20	2.80	3.38	4.63	5.29	5.96	6.64	8.03	8.74	10.20*	14.75*	19.56*		
	30	3.35	4.14	5.81	6.67	7.54	8.43	10.26	11.19	13.10*	19.08*	25.41*		
	40	3.85	4.84	6.89	7.94	9.00	10.09	12.31	13.44	15.76*	23.06*	30.78*		
	60	4.78	6.14	8.87	10.26	11.68	13.11	16.06	17.57	20.64*	30.34*	40.63*		
	70	5.22	6.75	9.80	11.35	12.93	14.53	17.82	19.50	22.93*	33.75*	45.23*		
	80	5.64	7.34	10.70	12.40	14.14	15.90	19.51	21.36	25.13*	37.03*	49.67*		
20	5	2.01	2.21	2.72	2.99	3.27	3.55	4.14	4.44	5.06*	7.01*	9.03*		
	10	2.43	2.74	3.48	3.89	4.30	4.73	5.61	6.07	7.00*	9.92*	12.98*		
	20	3.08	3.59	4.79	5.43	6.08	6.75	8.13	8.84	10.28*	14.83*	19.63*		
	30	3.62	4.34	5.95	6.79	7.65	8.54	10.35	11.27	13.17*	19.15*	25.47*		
	40	4.12	5.04	7.02	8.05	9.11	10.18	12.39	13.52	15.83*	23.12*	30.84*		
	60	5.03	6.32	8.99	10.37	11.77	13.20	16.14	17.64	20.71*	30.40*	40.68*		
	70	5.46	6.92	9.92	11.45	13.02	14.62	17.89	19.56	22.99*	33.80*	45.28*		
	80	5.88	7.51	10.81	12.50	14.23	15.98	19.58	21.42	25.19*	37.09*	49.72*		
50	5	2.40	2.61	3.12	3.39	3.67	3.94	4.51	4.80	5.41*	7.34*	9.34*		
	10	2.92	3.22	3.93	4.31	4.71	5.11	5.96	6.39	7.30*	10.19*	13.24*		
	20	3.67	4.13	5.23	5.82	6.45	7.09	8.42	9.11	10.54*	15.07*	19.85*		
	30	4.26	4.89	6.36	7.16	7.99	8.84	10.62	11.53	13.41*	19.36*	25.67*		
	40	4.79	5.57	7.41	8.40	9.42	10.47	12.64	13.76	16.05*	23.32*	31.03*		
	60	5.71	6.83	9.35	10.68	12.06	13.46	16.36	17.85	20.91*	30.58*	40.85*		
	70	6.14	7.42	10.26	11.76	13.29	14.87	18.11	19.77	23.18*	33.98*	45.45*		
	80	6.55	7.99	11.14	12.80	14.49	16.22	19.79	21.62	25.38*	37.25*	49.88*		
100	5	2.81	3.03	3.58	3.86	4.14	4.43	5.00	5.29	5.91*	7.84*	9.83*		
	10	3.44	3.75	4.48	4.86	5.26	5.65	6.47	6.90	7.79*	10.65*	13.66*		
	20	4.32	4.78	5.84	6.41	7.01	7.62	8.90	9.57	10.97*	15.46*	20.21*		
	30	5.00	5.59	6.98	7.74	8.52	9.34	11.06	11.94	13.80*	19.72*	26.00*		
	40	5.58	6.31	8.02	8.95	9.93	10.94	13.05	14.15	16.42*	23.65*	31.34*		
	60	6.58	7.58	9.92	11.20	12.52	13.89	16.74	18.21	21.24*	30.88*	41.13*		
	70	7.03	8.17	10.82	12.25	13.74	15.28	18.47	20.11	23.50*	34.26*	45.71*		
	80	7.45	8.73	11.68	13.28	14.93	16.63	20.14	21.95	25.69*	37.53*	50.14*		

SPACING = 4.5 m (RADIUS = 3.2 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 150	°C												
	5	3.10	3.34	3.91	4.21	4.50	4.80	5.39	5.69	6.32*	8.29*	10.29*	
	10	3.82	4.14	4.90	5.29	5.69	6.09	6.92	7.34	8.23*	11.09*	14.08*	
	20	4.80	5.26	6.34	6.91	7.50	8.10	9.35	10.00	11.38*	15.84*	20.57*	
	30	5.55	6.14	7.51	8.25	9.02	9.82	11.48	12.35	14.18*	20.07*	26.33*	
	40	6.18	6.90	8.56	9.47	10.42	11.40	13.46	14.53	16.78*	23.98*	31.64*	
	60	7.25	8.22	10.46	11.69	12.98	14.32	17.11	18.56	21.57*	31.18*	41.41*	
	70	7.73	8.82	11.35	12.74	14.19	15.69	18.83	20.45	23.82*	34.55*	45.98*	
200	80	8.18	9.39	12.21	13.75	15.36	17.02	20.49	22.28	25.99*	37.81*	50.40*	
	5	3.34	3.59	4.19	4.49	4.80	5.11	5.71	6.02	6.66*	8.69*	10.72*	
	10	4.13	4.46	5.24	5.65	6.06	6.47	7.30	7.72	8.62*	11.50*	14.49*	
	20	5.20	5.67	6.76	7.34	7.93	8.53	9.77	10.41	11.78*	16.22*	20.93*	
	30	6.00	6.60	7.98	8.71	9.47	10.26	11.90	12.75	14.56*	20.42*	26.66*	
	40	6.68	7.39	9.05	9.94	10.87	11.84	13.86	14.91	17.13*	24.31*	31.95*	
	60	7.81	8.76	10.97	12.17	13.43	14.73	17.48	18.90	21.89*	31.47*	41.68*	
	70	8.32	9.38	11.86	13.21	14.62	16.10	19.18	20.79	24.13*	34.84*	46.25*	
250	80	8.79	9.97	12.71	14.21	15.78	17.42	20.83	22.61	26.30*	38.09*	50.66*	
	5	3.55	3.81	4.42	4.74	5.06	5.37	6.00	6.31	6.97*	9.04*	11.10*	
	10	4.39	4.74	5.54	5.96	6.38	6.80	7.64	8.07	8.98*	11.89*	14.89*	
	20	5.53	6.02	7.13	7.72	8.31	8.92	10.16	10.80	12.16*	16.60*	21.29*	
	30	6.39	6.99	8.39	9.13	9.89	10.67	12.29	13.13	14.93*	20.76*	26.98*	
	40	7.10	7.82	9.49	10.38	11.30	12.25	14.24	15.28	17.49*	24.63*	32.25*	
	60	8.30	9.25	11.43	12.62	13.85	15.14	17.84	19.25	22.22*	31.77*	41.96*	
	70	8.83	9.88	12.33	13.66	15.05	16.49	19.54	21.12	24.44*	35.12*	46.51*	
300	80	9.32	10.49	13.18	14.66	16.20	17.81	21.18	22.93	26.60*	38.36*	50.91*	
	5	3.73	4.00	4.63	4.96	5.28	5.61	6.25	6.57	7.24*	9.36*	11.46*	
	10	4.63	4.98	5.81	6.23	6.66	7.09	7.95	8.38	9.31*	12.25*	15.27*	
	20	5.83	6.32	7.46	8.06	8.66	9.27	10.52	11.15	12.53*	16.96*	21.64*	
	30	6.73	7.35	8.76	9.51	10.27	11.05	12.66	13.50	15.29*	21.11*	27.31*	
	40	7.48	8.21	9.89	10.78	11.70	12.64	14.62	15.64	17.83*	24.95*	32.56*	
	60	8.74	9.68	11.86	13.04	14.26	15.53	18.20	19.59	22.54*	32.06*	42.24*	
	70	9.29	10.34	12.77	14.08	15.45	16.88	19.88	21.45	24.76*	35.41*	46.78*	
400	80	9.80	10.96	13.63	15.08	16.60	18.19	21.52	23.25	26.90*	38.64*	51.17*	
	5	4.04	4.32	5.00	5.34	5.68	6.02	6.69	7.02	7.73*	9.93*	12.09*	
	10	5.03	5.40	6.27	6.72	7.16	7.61	8.50	8.94	9.90*	12.92*	15.98*	
	20	6.35	6.86	8.05	8.66	9.27	9.90	11.16	11.81	13.19*	17.66*	22.33*	
	30	7.33	7.96	9.42	10.18	10.95	11.74	13.35	14.18	15.97*	21.78*	27.95*	
	40	8.14	8.89	10.60	11.50	12.42	13.36	15.32	16.33	18.51*	25.59*	33.16*	
	60	9.50	10.45	12.64	13.81	15.02	16.27	18.89	20.26	23.17*	32.65*	42.79*	
	70	10.08	11.14	13.57	14.87	16.22	17.62	20.57	22.11	25.37*	35.97*	47.31*	
80	10.63	11.79	14.45	15.88	17.37	18.92	22.19	23.89	27.50*	39.19*	51.69*		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.0 m (RADIUS = 3.5 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	5	0.49	0.54	0.68	0.74	0.81	0.88	1.02	1.09	1.23*	1.65*	2.07*	
	10	0.54	0.61	0.78	0.87	0.96	1.04	1.22	1.31	1.49*	2.03*	2.57*	
	20	0.63	0.74	0.96	1.08	1.20	1.31	1.55	1.67	1.92*	2.66*	3.42*	
	30	0.71	0.84	1.12	1.26	1.41	1.55	1.84	1.99	2.29*	3.21*	4.17*	
	40	0.78	0.94	1.27	1.43	1.60	1.77	2.11	2.28	2.64*	3.72*	4.86*	
	60	0.91	1.12	1.53	1.74	1.95	2.17	2.60	2.82	3.27*	4.66*	6.11*	
	70	0.97	1.20	1.65	1.88	2.12	2.35	2.83	3.07	3.56*	5.10*	6.70*	
	80	1.03	1.28	1.77	2.02	2.28	2.53	3.05	3.31	3.85*	5.52*	7.27*	
10	5	0.65	0.70	0.82	0.88	0.95	1.02	1.15	1.21	1.34*	1.76*	2.17*	
	10	0.73	0.79	0.93	1.01	1.09	1.17	1.34	1.42	1.59*	2.12*	2.66*	
	20	0.84	0.92	1.11	1.21	1.32	1.43	1.65	1.77	2.00*	2.74*	3.50*	
	30	0.93	1.02	1.26	1.39	1.52	1.66	1.94	2.08	2.37*	3.29*	4.24*	
	40	1.01	1.12	1.40	1.55	1.71	1.87	2.20	2.37	2.71*	3.79*	4.92*	
	60	1.14	1.29	1.65	1.85	2.05	2.26	2.68	2.89	3.33*	4.72*	6.17*	
	70	1.20	1.37	1.77	1.99	2.21	2.44	2.90	3.14	3.63*	5.15*	6.75*	
	80	1.25	1.44	1.89	2.12	2.37	2.61	3.12	3.38	3.91*	5.57*	7.32*	
20	5	0.72	0.76	0.89	0.96	1.03	1.09	1.23	1.30	1.43*	1.85*	2.26*	
	10	0.82	0.87	1.02	1.10	1.18	1.27	1.43	1.51	1.68*	2.21*	2.74*	
	20	0.95	1.02	1.22	1.32	1.42	1.53	1.75	1.86	2.09*	2.81*	3.57*	
	30	1.05	1.14	1.37	1.50	1.62	1.75	2.02	2.16	2.45*	3.36*	4.30*	
	40	1.14	1.25	1.51	1.66	1.81	1.96	2.28	2.45	2.78*	3.86*	4.98*	
	60	1.29	1.42	1.77	1.95	2.14	2.34	2.75	2.97	3.40*	4.78*	6.23*	
	70	1.35	1.51	1.88	2.09	2.30	2.52	2.98	3.21	3.69*	5.21*	6.81*	
	80	1.41	1.58	2.00	2.22	2.46	2.70	3.19	3.45	3.97*	5.63*	7.37*	
50	5	0.84	0.89	1.03	1.10	1.17	1.24	1.39	1.46	1.60*	2.04*	2.48*	
	10	0.97	1.03	1.19	1.28	1.37	1.45	1.62	1.71	1.88*	2.43*	2.97*	
	20	1.15	1.23	1.43	1.54	1.64	1.75	1.97	2.08	2.30*	3.03*	3.78*	
	30	1.28	1.37	1.61	1.74	1.86	1.99	2.26	2.39	2.66*	3.56*	4.50*	
	40	1.39	1.50	1.77	1.91	2.06	2.20	2.51	2.67	2.99*	4.05*	5.16*	
	60	1.57	1.71	2.04	2.21	2.40	2.59	2.98	3.18	3.59*	4.96*	6.39*	
	70	1.65	1.80	2.16	2.35	2.56	2.76	3.19	3.42	3.88*	5.38*	6.97*	
	80	1.72	1.88	2.28	2.49	2.71	2.93	3.41	3.65	4.15*	5.79*	7.53*	
100	5	0.96	1.01	1.17	1.24	1.32	1.40	1.56	1.63	1.78*	2.26*	2.73*	
	10	1.13	1.19	1.37	1.47	1.56	1.65	1.84	1.93	2.11*	2.69*	3.26*	
	20	1.35	1.43	1.66	1.77	1.89	2.00	2.23	2.35	2.57*	3.33*	4.09*	
	30	1.51	1.61	1.87	2.00	2.14	2.27	2.54	2.68	2.95*	3.87*	4.80*	
	40	1.65	1.76	2.05	2.20	2.35	2.50	2.81	2.97	3.29*	4.35*	5.46*	
	60	1.87	2.01	2.35	2.54	2.72	2.91	3.29	3.49	3.89*	5.24*	6.66*	
	70	1.96	2.12	2.49	2.69	2.89	3.09	3.51	3.73	4.17*	5.66*	7.23*	
	80	2.05	2.22	2.62	2.83	3.05	3.27	3.72	3.96	4.44*	6.06*	7.78*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.0 m (RADIUS = 3.5 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

CEILING HEIGHT, m

RESPONSE TEMPERATURE
TIME INDEX RISE

(m*s) ^{1/2}	1	2	4	5	6	7	9	10	12	18	24
150	1.04	1.11	1.27	1.35	1.43	1.52	1.68	1.76	1.92*	2.42*	2.91*
	1.24	1.31	1.50	1.60	1.70	1.80	1.99	2.09	2.27*	2.89*	3.49*
	1.49	1.59	1.82	1.94	2.06	2.19	2.43	2.55	2.78*	3.57*	4.36*
	1.68	1.79	2.06	2.20	2.34	2.48	2.76	2.90	3.18*	4.13*	5.08*
	1.83	1.96	2.26	2.42	2.57	2.73	3.05	3.21	3.53*	4.62*	5.73*
	2.09	2.23	2.59	2.78	2.97	3.16	3.55	3.75	4.15*	5.51*	6.93*
	2.19	2.35	2.74	2.94	3.15	3.36	3.78	4.00	4.44*	5.93*	7.49*
	2.29	2.46	2.88	3.09	3.31	3.54	4.00	4.23	4.71*	6.33*	8.03*
200	1.12	1.18	1.35	1.44	1.52	1.61	1.78	1.86	2.02*	2.56*	3.06*
	1.33	1.41	1.61	1.71	1.81	1.92	2.12	2.22	2.41*	3.06*	3.68*
	1.61	1.71	1.96	2.08	2.21	2.34	2.59	2.71	2.96*	3.78*	4.59*
	1.82	1.93	2.22	2.36	2.51	2.66	2.95	3.09	3.38*	4.35*	5.32*
	1.99	2.11	2.43	2.59	2.76	2.92	3.25	3.42	3.74*	4.86*	5.98*
	2.26	2.42	2.79	2.98	3.18	3.38	3.78	3.98	4.38*	5.76*	7.18*
	2.38	2.55	2.95	3.16	3.37	3.58	4.01	4.23	4.67*	6.17*	7.74*
	2.49	2.67	3.09	3.32	3.54	3.77	4.23	4.47	4.95*	6.57*	8.28*
250	1.18	1.24	1.42	1.51	1.60	1.69	1.86	1.95	2.12*	2.67*	3.20*
	1.41	1.49	1.70	1.81	1.91	2.02	2.23	2.33	2.53*	3.20*	3.85*
	1.71	1.81	2.07	2.20	2.34	2.47	2.73	2.86	3.11*	3.96*	4.79*
	1.94	2.05	2.35	2.50	2.65	2.80	3.11	3.26	3.55*	4.55*	5.54*
	2.12	2.25	2.58	2.75	2.92	3.09	3.43	3.60	3.93*	5.07*	6.21*
	2.41	2.57	2.96	3.16	3.36	3.57	3.97	4.18	4.59*	5.99*	7.42*
	2.54	2.71	3.13	3.34	3.56	3.78	4.22	4.44	4.88*	6.40*	7.97*
	2.66	2.84	3.28	3.51	3.74	3.97	4.44	4.68	5.16*	6.81*	8.51*
300	1.23	1.30	1.48	1.57	1.67	1.76	1.94	2.03	2.20*	2.77*	3.31*
	1.48	1.56	1.78	1.89	2.00	2.11	2.32	2.43	2.64*	3.33*	3.99*
	1.80	1.91	2.17	2.31	2.45	2.58	2.85	2.98	3.24*	4.12*	4.97*
	2.04	2.16	2.47	2.62	2.78	2.94	3.25	3.40	3.70*	4.73*	5.75*
	2.23	2.37	2.71	2.88	3.06	3.23	3.58	3.75	4.10*	5.26*	6.43*
	2.55	2.71	3.11	3.32	3.52	3.73	4.15	4.36	4.77*	6.20*	7.64*
	2.68	2.86	3.28	3.51	3.73	3.95	4.40	4.62	5.07*	6.62*	8.20*
	2.80	2.99	3.45	3.68	3.92	4.16	4.63	4.88	5.36*	7.02*	8.74*
400	1.32	1.39	1.59	1.68	1.78	1.88	2.07	2.16	2.34*	2.95*	3.51*
	1.60	1.68	1.91	2.03	2.15	2.26	2.49	2.60	2.82*	3.55*	4.25*
	1.96	2.07	2.35	2.50	2.64	2.78	3.06	3.20	3.47*	4.40*	5.29*
	2.22	2.35	2.67	2.84	3.00	3.17	3.49	3.65	3.97*	5.05*	6.10*
	2.43	2.58	2.94	3.12	3.31	3.49	3.85	4.03	4.39*	5.61*	6.81*
	2.78	2.95	3.37	3.59	3.81	4.02	4.46	4.67	5.10*	6.57*	8.05*
	2.92	3.11	3.56	3.79	4.03	4.26	4.72	4.95	5.42*	7.01*	8.62*
	3.06	3.26	3.74	3.98	4.23	4.48	4.97	5.22	5.71*	7.42*	9.16*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.0 m (RADIUS = 3.5 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s²)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
0	5	0.70	0.79	1.00	1.11	1.22	1.33	1.55	1.66	1.88*	2.55*	3.23*	
	10	0.80	0.93	1.21	1.36	1.50	1.65	1.94	2.09	2.39*	3.31*	4.24*	
	20	0.98	1.17	1.57	1.77	1.98	2.19	2.61	2.82	3.25*	4.57*	5.95*	
	30	1.14	1.38	1.89	2.14	2.40	2.66	3.19	3.46	4.00*	5.68*	7.44*	
	40	1.28	1.58	2.18	2.48	2.79	3.09	3.72	4.04	4.69*	6.70*	8.81*	
	60	1.54	1.94	2.71	3.10	3.49	3.89	4.70	5.11	5.95*	8.57*	11.33*	
	70	1.66	2.10	2.96	3.39	3.82	4.26	5.16	5.62	6.54*	9.45*	12.50*	
	80	1.78	2.26	3.20	3.67	4.14	4.62	5.60	6.10	7.11*	10.29*	13.63*	
10	5	0.92	0.99	1.18	1.28	1.38	1.48	1.68	1.79	2.00*	2.66*	3.33*	
	10	1.06	1.15	1.39	1.52	1.65	1.78	2.06	2.20	2.49*	3.40*	4.33*	
	20	1.25	1.39	1.73	1.92	2.11	2.30	2.71	2.91	3.33*	4.65*	6.02*	
	30	1.41	1.59	2.03	2.27	2.52	2.77	3.28	3.54	4.08*	5.75*	7.51*	
	40	1.55	1.77	2.31	2.60	2.89	3.19	3.81	4.12	4.76*	6.77*	8.88*	
	60	1.80	2.11	2.83	3.21	3.59	3.98	4.78	5.19	6.02*	8.63*	11.38*	
	70	1.91	2.28	3.08	3.49	3.92	4.35	5.23	5.69	6.61*	9.50*	12.56*	
	80	2.02	2.43	3.31	3.77	4.23	4.71	5.67	6.17	7.18*	10.34*	13.69*	
20	5	1.02	1.09	1.29	1.39	1.49	1.59	1.80	1.90	2.11*	2.77*	3.43*	
	10	1.18	1.28	1.51	1.64	1.77	1.90	2.17	2.31	2.59*	3.49*	4.42*	
	20	1.41	1.54	1.87	2.04	2.23	2.42	2.81	3.01	3.42*	4.73*	6.10*	
	30	1.58	1.75	2.17	2.39	2.63	2.87	3.37	3.63	4.16*	5.83*	7.58*	
	40	1.73	1.94	2.44	2.72	3.00	3.29	3.89	4.20	4.84*	6.84*	8.94*	
	60	2.00	2.28	2.95	3.31	3.69	4.07	4.86	5.26	6.09*	8.69*	11.44*	
	70	2.12	2.44	3.19	3.60	4.01	4.44	5.31	5.76	6.67*	9.56*	12.61*	
	80	2.23	2.59	3.42	3.87	4.32	4.79	5.75	6.24	7.24*	10.40*	13.74*	
50	5	1.21	1.28	1.49	1.60	1.70	1.81	2.03	2.13	2.35*	3.03*	3.71*	
	10	1.42	1.51	1.77	1.90	2.03	2.17	2.44	2.58	2.85*	3.75*	4.67*	
	20	1.70	1.84	2.17	2.34	2.52	2.71	3.08	3.27	3.67*	4.96*	6.31*	
	30	1.92	2.08	2.49	2.71	2.93	3.16	3.63	3.88	4.38*	6.04*	7.77*	
	40	2.10	2.30	2.77	3.03	3.30	3.57	4.14	4.44	5.05*	7.03*	9.12*	
	60	2.41	2.67	3.28	3.62	3.97	4.33	5.09	5.48	6.28*	8.87*	11.61*	
	70	2.55	2.83	3.52	3.89	4.28	4.69	5.53	5.97	6.86*	9.73*	12.77*	
	80	2.67	2.99	3.75	4.16	4.59	5.04	5.96	6.44	7.42*	10.57*	13.89*	
100	5	1.39	1.48	1.70	1.82	1.93	2.05	2.28	2.39	2.62*	3.34*	4.05*	
	10	1.66	1.76	2.04	2.18	2.32	2.46	2.75	2.89	3.17*	4.11*	5.04*	
	20	2.01	2.15	2.50	2.69	2.87	3.06	3.44	3.63	4.02*	5.32*	6.66*	
	30	2.28	2.45	2.87	3.09	3.31	3.54	4.01	4.25	4.74*	6.38*	8.10*	
	40	2.49	2.69	3.18	3.44	3.70	3.97	4.52	4.81	5.40*	7.36*	9.43*	
	60	2.86	3.11	3.72	4.05	4.38	4.73	5.45	5.83	6.60*	9.17*	11.88*	
	70	3.02	3.30	3.97	4.33	4.70	5.08	5.89	6.31	7.17*	10.02*	13.04*	
	80	3.16	3.47	4.20	4.59	5.00	5.43	6.31	6.77	7.72*	10.84*	14.15*	

SPACING = 5.0 m (RADIUS = 3.5 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}	°C											
150	5	1.53	1.62	1.85	1.98	2.10	2.22	2.46	2.58	2.82*	3.58*	4.32*
	10	1.83	1.94	2.23	2.38	2.53	2.68	2.98	3.13	3.42*	4.39*	5.35*
	20	2.24	2.38	2.75	2.95	3.14	3.34	3.73	3.92	4.31*	5.64*	6.99*
	30	2.53	2.71	3.15	3.38	3.61	3.85	4.32	4.56	5.05*	6.70*	8.41*
	40	2.78	2.99	3.49	3.75	4.02	4.29	4.85	5.13	5.71*	7.67*	9.72*
	60	3.19	3.45	4.07	4.40	4.73	5.08	5.79	6.16	6.91*	9.46*	12.15*
	70	3.36	3.65	4.32	4.68	5.05	5.43	6.22	6.63	7.47*	10.30*	13.30*
	80	3.53	3.84	4.57	4.96	5.36	5.78	6.64	7.09	8.02*	11.11*	14.41*
200	5	1.64	1.73	1.98	2.11	2.24	2.36	2.62	2.74	2.98*	3.78*	4.55*
	10	1.97	2.09	2.39	2.55	2.71	2.86	3.17	3.33	3.63*	4.64*	5.63*
	20	2.42	2.57	2.96	3.16	3.36	3.56	3.96	4.16	4.56*	5.92*	7.29*
	30	2.74	2.93	3.39	3.62	3.86	4.10	4.59	4.83	5.32*	6.99*	8.71*
	40	3.01	3.23	3.75	4.02	4.29	4.57	5.13	5.42	5.99*	7.96*	10.01*
	60	3.46	3.72	4.36	4.69	5.03	5.38	6.09	6.45	7.20*	9.74*	12.42*
	70	3.65	3.94	4.63	4.99	5.36	5.74	6.53	6.93	7.76*	10.57*	13.56*
	80	3.82	4.14	4.88	5.28	5.68	6.09	6.95	7.39	8.30*	11.38*	14.66*
250	5	1.73	1.83	2.09	2.22	2.35	2.49	2.75	2.87	3.12*	3.95*	4.75*
	10	2.09	2.21	2.53	2.69	2.86	3.02	3.34	3.50	3.81*	4.85*	5.87*
	20	2.57	2.73	3.13	3.34	3.55	3.76	4.17	4.38	4.78*	6.17*	7.56*
	30	2.92	3.12	3.59	3.83	4.08	4.32	4.82	5.07	5.56*	7.26*	8.99*
	40	3.21	3.43	3.97	4.25	4.53	4.81	5.38	5.67	6.25*	8.24*	10.29*
	60	3.69	3.96	4.61	4.95	5.29	5.65	6.36	6.73	7.47*	10.01*	12.69*
	70	3.89	4.19	4.89	5.26	5.64	6.02	6.81	7.21	8.03*	10.84*	13.82*
	80	4.08	4.40	5.16	5.55	5.96	6.38	7.23	7.67	8.57*	11.65*	14.91*
300	5	1.81	1.91	2.18	2.32	2.46	2.59	2.86	2.99	3.25*	4.10*	4.92*
	10	2.20	2.33	2.65	2.82	2.99	3.16	3.49	3.65	3.97*	5.04*	6.08*
	20	2.71	2.88	3.29	3.50	3.72	3.93	4.36	4.57	4.98*	6.40*	7.82*
	30	3.08	3.28	3.77	4.02	4.27	4.52	5.03	5.28	5.79*	7.51*	9.26*
	40	3.39	3.62	4.17	4.45	4.74	5.03	5.61	5.90	6.49*	8.50*	10.56*
	60	3.89	4.17	4.83	5.18	5.53	5.89	6.61	6.98	7.72*	10.28*	12.95*
	70	4.11	4.41	5.13	5.50	5.89	6.27	7.06	7.47	8.29*	11.11*	14.07*
	80	4.31	4.63	5.40	5.81	6.22	6.64	7.49	7.93	8.83*	11.91*	15.16*
400	5	1.95	2.06	2.34	2.49	2.63	2.78	3.06	3.20	3.47*	4.37*	5.23*
	10	2.38	2.52	2.86	3.04	3.22	3.39	3.74	3.91	4.24*	5.37*	6.46*
	20	2.94	3.12	3.56	3.78	4.01	4.23	4.68	4.90	5.33*	6.81*	8.27*
	30	3.36	3.57	4.08	4.34	4.61	4.87	5.40	5.66	6.18*	7.96*	9.75*
	40	3.69	3.93	4.51	4.81	5.11	5.41	6.01	6.31	6.91*	8.97*	11.07*
	60	4.24	4.53	5.23	5.59	5.95	6.32	7.05	7.43	8.18*	10.77*	13.46*
	70	4.48	4.79	5.54	5.93	6.32	6.72	7.52	7.93	8.76*	11.60*	14.57*
	80	4.70	5.04	5.83	6.25	6.67	7.10	7.97	8.41	9.31*	12.40*	15.65*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.0 m (RADIUS = 3.5 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE	CEILING HEIGHT, m											
			1	2	4	5	6	7	9	10	12	18	24	
0 														

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.0 m (RADIUS = 3.5 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
150	5	2.25	2.39	2.74	2.93	3.12	3.30	3.67	3.85	4.22*	5.41*	6.60*	
	10	2.73	2.91	3.36	3.60	3.84	4.08	4.56	4.80	5.28*	6.89*	8.54*	
	20	3.38	3.63	4.24	4.56	4.89	5.22	5.89	6.24	6.94*	9.31*	11.79*	
	30	3.86	4.18	4.93	5.32	5.73	6.15	7.01	7.45	8.37*	11.43*	14.68*	
	40	4.27	4.64	5.52	5.99	6.48	6.98	8.02	8.57	9.68*	13.41*	17.36*	
	60	4.94	5.43	6.57	7.19	7.83	8.49	9.89	10.62	12.12*	17.05*	22.30*	
	70	5.24	5.78	7.05	7.74	8.46	9.20	10.77	11.58	13.27*	18.77*	24.62*	
	80	5.51	6.11	7.51	8.27	9.06	9.89	11.62	12.52	14.38*	20.43*	26.86*	
200	5	2.41	2.56	2.94	3.13	3.32	3.52	3.90	4.09	4.46*	5.70*	6.92*	
	10	2.94	3.13	3.61	3.85	4.10	4.35	4.84	5.09	5.58*	7.23*	8.89*	
	20	3.65	3.91	4.54	4.87	5.21	5.54	6.23	6.57	7.27*	9.66*	12.14*	
	30	4.18	4.50	5.27	5.67	6.09	6.51	7.37	7.81	8.71*	11.77*	15.00*	
	40	4.62	5.00	5.89	6.37	6.86	7.36	8.39	8.92	10.02*	13.73*	17.66*	
	60	5.35	5.83	6.98	7.59	8.23	8.88	10.25	10.96	12.44*	17.35*	22.57*	
	70	5.66	6.20	7.47	8.15	8.86	9.59	11.12	11.92	13.57*	19.05*	24.88*	
	80	5.96	6.55	7.93	8.68	9.46	10.27	11.97	12.85	14.68*	20.70*	27.11*	
250	5	2.56	2.71	3.10	3.30	3.50	3.70	4.10	4.29	4.67*	5.96*	7.20*	
	10	3.13	3.33	3.82	4.07	4.32	4.58	5.09	5.34	5.84*	7.53*	9.22*	
	20	3.89	4.16	4.81	5.15	5.49	5.83	6.52	6.87	7.58*	9.98*	12.47*	
	30	4.46	4.78	5.57	5.98	6.40	6.82	7.69	8.13	9.03*	12.10*	15.32*	
	40	4.92	5.31	6.22	6.70	7.19	7.69	8.73	9.26	10.34*	14.04*	17.96*	
	60	5.70	6.19	7.34	7.95	8.59	9.24	10.59	11.30	12.75*	17.64*	22.85*	
	70	6.03	6.57	7.84	8.52	9.22	9.95	11.46	12.25	13.88*	19.33*	25.15*	
	80	6.34	6.94	8.32	9.06	9.83	10.63	12.30	13.17	14.97*	20.97*	27.37*	
300	5	2.68	2.84	3.24	3.45	3.66	3.86	4.27	4.47	4.86*	6.18*	7.46*	
	10	3.29	3.49	4.00	4.26	4.52	4.79	5.31	5.56	6.07*	7.80*	9.52*	
	20	4.10	4.38	5.04	5.39	5.74	6.09	6.79	7.15	7.86*	10.29*	12.79*	
	30	4.70	5.03	5.84	6.26	6.68	7.11	7.99	8.43	9.33*	12.41*	15.63*	
	40	5.19	5.58	6.51	7.00	7.50	8.00	9.04	9.57	10.65*	14.35*	18.26*	
	60	6.01	6.50	7.67	8.29	8.92	9.57	10.92	11.62	13.05*	17.93*	23.12*	
	70	6.36	6.90	8.18	8.86	9.57	10.29	11.79	12.57	14.18*	19.61*	25.41*	
	80	6.69	7.28	8.67	9.41	10.18	10.97	12.63	13.49	15.27*	21.25*	27.63*	
400	5	2.90	3.07	3.49	3.71	3.93	4.15	4.57	4.78	5.19*	6.58*	7.91*	
	10	3.57	3.79	4.32	4.60	4.87	5.15	5.69	5.96	6.49*	8.29*	10.06*	
	20	4.46	4.75	5.45	5.81	6.18	6.54	7.27	7.63	8.36*	10.86*	13.39*	
	30	5.12	5.47	6.31	6.74	7.18	7.62	8.52	8.97	9.87*	13.00*	16.23*	
	40	5.66	6.06	7.03	7.53	8.04	8.55	9.60	10.14	11.22*	14.94*	18.84*	
	60	6.54	7.05	8.25	8.88	9.52	10.17	11.52	12.21	13.63*	18.49*	23.66*	
	70	6.93	7.48	8.79	9.48	10.18	10.91	12.40	13.17	14.75*	20.16*	25.93*	
	80	7.28	7.89	9.30	10.05	10.81	11.60	13.24	14.09	15.83*	21.78*	28.13*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.0 m (RADIUS = 3.5 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	°C												
	5	1.56	1.85	2.45	2.75	3.06	3.37	4.00	4.32	4.96*	6.94*	8.98*	
	10	1.99	2.42	3.30	3.75	4.20	4.66	5.58	6.05	7.00*	9.95*	13.04*	
	20	2.70	3.39	4.74	5.43	6.12	6.82	8.24	8.96	10.43*	15.02*	19.85*	
	30	3.32	4.24	6.01	6.90	7.80	8.71	10.57	11.51	13.44*	19.47*	25.83*	
	40	3.89	5.01	7.17	8.25	9.34	10.45	12.71	13.86	16.20*	23.55*	31.32*	
	60	4.94	6.44	9.29	10.72	12.17	13.63	16.62	18.15	21.26*	31.02*	41.37*	
	70	5.42	7.10	10.28	11.88	13.49	15.12	18.45	20.15	23.62*	34.52*	46.06*	
10	80	5.90	7.75	11.24	12.99	14.76	16.56	20.22	22.09	25.90*	37.89*	50.59*	
	5	1.95	2.15	2.67	2.95	3.24	3.54	4.15	4.45	5.08*	7.05*	9.09*	
	10	2.36	2.70	3.49	3.92	4.35	4.80	5.70	6.16	7.10*	10.05*	13.12*	
	20	3.04	3.63	4.91	5.57	6.25	6.93	8.34	9.06	10.52*	15.10*	19.93*	
	30	3.63	4.45	6.15	7.03	7.91	8.82	10.66	11.60	13.52*	19.54*	25.89*	
	40	4.18	5.21	7.30	8.37	9.45	10.55	12.79	13.94	16.27*	23.62*	31.38*	
	60	5.20	6.62	9.41	10.83	12.27	13.72	16.70	18.22	21.32*	31.08*	41.42*	
	70	5.68	7.28	10.40	11.98	13.58	15.21	18.53	20.23	23.69*	34.58*	46.12*	
20	80	6.15	7.92	11.36	13.09	14.85	16.64	20.29	22.16	25.96*	37.94*	50.65*	
	5	2.17	2.36	2.86	3.13	3.41	3.70	4.29	4.59	5.21*	7.16*	9.19*	
	10	2.63	2.93	3.68	4.08	4.50	4.93	5.82	6.28	7.21*	10.14*	13.21*	
	20	3.33	3.85	5.07	5.71	6.37	7.05	8.44	9.15	10.61*	15.18*	20.00*	
	30	3.92	4.66	6.30	7.16	8.03	8.92	10.75	11.69	13.60*	19.61*	25.96*	
	40	4.47	5.41	7.44	8.49	9.56	10.65	12.88	14.02	16.35*	23.68*	31.44*	
	60	5.47	6.80	9.54	10.94	12.36	13.81	16.78	18.30	21.39*	31.14*	41.48*	
	70	5.94	7.45	10.52	12.09	13.68	15.29	18.60	20.30	23.75*	34.63*	46.17*	
50	80	6.39	8.09	11.47	13.20	14.95	16.72	20.37	22.23	26.03*	38.00*	50.70*	
	5	2.59	2.79	3.29	3.56	3.83	4.11	4.67	4.96	5.56*	7.49*	9.50*	
	10	3.15	3.44	4.15	4.53	4.92	5.33	6.18	6.62	7.51*	10.42*	13.47*	
	20	3.96	4.42	5.52	6.12	6.75	7.40	8.75	9.44	10.87*	15.42*	20.22*	
	30	4.60	5.23	6.73	7.54	8.38	9.24	11.03	11.95	13.83*	19.82*	26.16*	
	40	5.17	5.97	7.84	8.84	9.88	10.94	13.14	14.26	16.57*	23.88*	31.62*	
	60	6.18	7.33	9.90	11.26	12.66	14.08	17.01	18.52	21.59*	31.32*	41.65*	
	70	6.64	7.97	10.87	12.40	13.96	15.55	18.83	20.51	23.94*	34.81*	46.33*	
100	80	7.09	8.58	11.81	13.50	15.22	16.98	20.58	22.43	26.21*	38.17*	50.85*	
	5	3.02	3.23	3.77	4.04	4.33	4.61	5.18	5.47	6.06*	8.00*	9.99*	
	10	3.70	4.00	4.72	5.10	5.49	5.89	6.71	7.14	8.00*	10.87*	13.90*	
	20	4.65	5.10	6.16	6.74	7.33	7.95	9.24	9.91	11.29*	15.81*	20.58*	
	30	5.38	5.97	7.37	8.14	8.93	9.76	11.48	12.38	14.22*	20.18*	26.49*	
	40	6.01	6.74	8.47	9.42	10.41	11.43	13.56	14.67	16.93*	24.21*	31.93*	
	60	7.09	8.12	10.50	11.79	13.14	14.53	17.40	18.88	21.92*	31.62*	41.92*	
	70	7.58	8.75	11.45	12.91	14.43	15.98	19.20	20.86	24.26*	35.09*	46.60*	
80	8.05	9.36	12.38	14.00	15.67	17.39	20.95	22.77	26.52*	38.45*	51.11*		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.0 m (RADIUS = 3.5 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °C	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 (m*s) ^{1/2}	5	3.34	3.56	4.12	4.41	4.70	5.00	5.59	5.88	6.47*	8.45*	10.45*	
	10	4.11	4.41	5.16	5.55	5.95	6.35	7.17	7.59	8.44*	11.31*	14.32*	
	20	5.17	5.61	6.68	7.26	7.84	8.45	9.71	10.36	11.71*	16.19*	20.95*	
	30	5.97	6.55	7.93	8.67	9.45	10.25	11.93	12.80	14.61*	20.53*	26.82*	
	40	6.65	7.36	9.04	9.96	10.91	11.90	13.98	15.06	17.29*	24.54*	32.24*	
	60	7.81	8.78	11.06	12.31	13.61	14.96	17.78	19.25	22.25*	31.92*	42.20*	
	70	8.33	9.43	12.01	13.42	14.89	16.41	19.57	21.21	24.57*	35.38*	46.87*	
	80	8.81	10.05	12.92	14.49	16.12	17.80	21.30	23.11	26.83*	38.72*	51.37*	
200	5	3.59	3.83	4.41	4.71	5.01	5.32	5.92	6.22	6.83*	8.85*	10.88*	
	10	4.44	4.75	5.52	5.92	6.33	6.74	7.57	7.99	8.84*	11.73*	14.73*	
	20	5.59	6.04	7.13	7.70	8.29	8.90	10.14	10.79	12.11*	16.57*	21.30*	
	30	6.45	7.04	8.42	9.15	9.92	10.71	12.36	13.21	14.98*	20.88*	27.15*	
	40	7.18	7.89	9.55	10.45	11.39	12.36	14.40	15.46	17.65*	24.87*	32.55*	
	60	8.41	9.36	11.59	12.80	14.07	15.40	18.17	19.61	22.57*	32.22*	42.48*	
	70	8.95	10.03	12.53	13.90	15.34	16.83	19.94	21.56	24.89*	35.67*	47.13*	
	80	9.46	10.66	13.44	14.96	16.56	18.21	21.66	23.45	27.13*	39.00*	51.63*	
250	5	3.81	4.05	4.66	4.97	5.28	5.59	6.21	6.52	7.14*	9.20*	11.27*	
	10	4.72	5.04	5.84	6.25	6.66	7.08	7.93	8.35	9.21*	12.12*	15.13*	
	20	5.95	6.41	7.52	8.10	8.69	9.30	10.54	11.18	12.49*	16.95*	21.66*	
	30	6.87	7.46	8.85	9.59	10.35	11.13	12.76	13.61	15.35*	21.22*	27.47*	
	40	7.64	8.35	10.01	10.91	11.83	12.79	14.80	15.84	18.00*	25.19*	32.85*	
	60	8.93	9.87	12.07	13.27	14.52	15.82	18.54	19.96	22.90*	32.51*	42.76*	
	70	9.50	10.56	13.02	14.37	15.77	17.24	20.31	21.91	25.20*	35.95*	47.40*	
	80	10.03	11.20	13.93	15.43	16.99	18.61	22.02	23.79	27.43*	39.28*	51.89*	
300	5	4.01	4.26	4.88	5.20	5.52	5.84	6.48	6.79	7.42*	9.53*	11.62*	
	10	4.97	5.30	6.12	6.54	6.96	7.39	8.25	8.68	9.54*	12.49*	15.51*	
	20	6.27	6.74	7.86	8.45	9.05	9.67	10.91	11.55	12.86*	17.31*	22.01*	
	30	7.24	7.83	9.24	9.98	10.75	11.53	13.15	13.99	15.72*	21.57*	27.80*	
	40	8.04	8.76	10.43	11.32	12.25	13.20	15.18	16.21	18.35*	25.51*	33.15*	
	60	9.40	10.34	12.53	13.71	14.94	16.22	18.91	20.32	23.22*	32.81*	43.03*	
	70	9.99	11.04	13.48	14.81	16.20	17.64	20.67	22.25	25.51*	36.24*	47.67*	
	80	10.54	11.70	14.40	15.87	17.41	19.01	22.37	24.12	27.74*	39.55*	52.15*	
400	5	4.34	4.60	5.26	5.59	5.93	6.27	6.93	7.26	7.91*	10.11*	12.27*	
	10	5.40	5.75	6.60	7.04	7.48	7.93	8.81	9.25	10.14*	13.16*	16.22*	
	20	6.82	7.31	8.47	9.08	9.70	10.32	11.59	12.23	13.53*	18.01*	22.70*	
	30	7.87	8.49	9.93	10.68	11.46	12.24	13.86	14.70	16.40*	22.24*	28.44*	
	40	8.75	9.48	11.18	12.07	13.00	13.95	15.91	16.93	19.03*	26.15*	33.76*	
	60	10.21	11.15	13.34	14.52	15.73	16.99	19.63	21.01	23.86*	33.40*	43.58*	
	70	10.84	11.89	14.32	15.63	16.99	18.41	21.37	22.92	26.13*	36.80*	48.20*	
	80	11.43	12.58	15.26	16.70	18.21	19.77	23.06	24.78	28.34*	40.10*	52.66*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.5 m (RADIUS = 3.9 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °C	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
0 (m*s) ^{1/2}	5	0.53	0.58	0.71	0.78	0.85	0.92	1.05	1.12	1.26	1.68*	2.10*
	10	0.58	0.66	0.82	0.91	1.00	1.08	1.26	1.35	1.53	2.07*	2.61*
	20	0.68	0.79	1.01	1.13	1.25	1.37	1.61	1.73	1.97	2.72*	3.48*
	30	0.77	0.90	1.18	1.32	1.47	1.61	1.91	2.06	2.36	3.28*	4.24*
	40	0.84	1.00	1.33	1.50	1.67	1.84	2.19	2.36	2.71	3.81*	4.94*
	60	0.98	1.19	1.62	1.83	2.04	2.26	2.69	2.92	3.37	4.76*	6.23*
	70	1.05	1.28	1.75	1.98	2.21	2.45	2.93	3.18	3.67	5.21*	6.82*
	80	1.12	1.37	1.87	2.13	2.38	2.64	3.16	3.43	3.97	5.64*	7.40*
10	5	0.70	0.74	0.86	0.92	0.99	1.05	1.18	1.25	1.38	1.79*	2.20*
	10	0.79	0.84	0.98	1.06	1.14	1.22	1.38	1.46	1.63	2.16*	2.70*
	20	0.91	0.98	1.17	1.27	1.38	1.48	1.71	1.82	2.06	2.79*	3.56*
	30	1.00	1.09	1.32	1.45	1.59	1.72	2.00	2.15	2.44	3.36*	4.31*
	40	1.08	1.19	1.47	1.62	1.78	1.94	2.27	2.44	2.79	3.87*	5.01*
	60	1.22	1.37	1.74	1.94	2.14	2.35	2.77	2.99	3.44	4.82*	6.28*
	70	1.29	1.46	1.87	2.09	2.31	2.54	3.01	3.25	3.74	5.27*	6.88*
	80	1.35	1.54	1.99	2.23	2.48	2.73	3.24	3.50	4.03	5.70*	7.45*
20	5	0.77	0.81	0.93	1.00	1.07	1.13	1.27	1.34	1.47	1.88*	2.29*
	10	0.87	0.93	1.07	1.15	1.23	1.31	1.48	1.56	1.72	2.25*	2.79*
	20	1.02	1.09	1.28	1.38	1.48	1.59	1.81	1.92	2.15	2.87*	3.63*
	30	1.13	1.22	1.44	1.57	1.69	1.82	2.09	2.23	2.52	3.43*	4.38*
	40	1.22	1.32	1.59	1.74	1.89	2.04	2.36	2.53	2.86	3.94*	5.07*
	60	1.38	1.52	1.86	2.05	2.24	2.44	2.85	3.07	3.50	4.88*	6.34*
	70	1.45	1.60	1.98	2.19	2.41	2.63	3.09	3.32	3.80	5.33*	6.93*
	80	1.51	1.69	2.10	2.33	2.57	2.81	3.31	3.57	4.09	5.76*	7.51*
50	5	0.90	0.94	1.08	1.15	1.22	1.29	1.43	1.50	1.64	2.08*	2.51*
	10	1.04	1.09	1.25	1.34	1.42	1.51	1.68	1.76	1.93	2.47*	3.01*
	20	1.23	1.30	1.50	1.60	1.71	1.82	2.04	2.15	2.37	3.09*	3.84*
	30	1.37	1.46	1.69	1.81	1.94	2.07	2.33	2.47	2.74	3.63*	4.57*
	40	1.48	1.59	1.85	2.00	2.14	2.29	2.60	2.76	3.08	4.13*	5.25*
	60	1.68	1.81	2.14	2.32	2.50	2.69	3.08	3.29	3.70	5.06*	6.50*
	70	1.76	1.91	2.27	2.46	2.67	2.88	3.31	3.53	4.00	5.50*	7.09*
	80	1.84	2.00	2.39	2.61	2.83	3.05	3.53	3.77	4.28	5.92*	7.66*
100	5	1.03	1.08	1.22	1.30	1.38	1.45	1.61	1.68	1.83	2.30*	2.76*
	10	1.20	1.27	1.44	1.53	1.62	1.71	1.90	1.99	2.17	2.74*	3.31*
	20	1.44	1.52	1.74	1.85	1.96	2.08	2.31	2.42	2.65	3.39*	4.15*
	30	1.62	1.71	1.96	2.09	2.23	2.36	2.63	2.77	3.04	3.94*	4.88*
	40	1.76	1.87	2.15	2.30	2.45	2.60	2.91	3.07	3.39	4.44*	5.54*
	60	2.00	2.13	2.47	2.65	2.84	3.03	3.41	3.61	4.01	5.35*	6.77*
	70	2.10	2.25	2.62	2.81	3.01	3.22	3.64	3.86	4.30	5.78*	7.35*
	80	2.19	2.35	2.75	2.96	3.18	3.40	3.86	4.09	4.58	6.19*	7.91*

TIME TO ACTIVATE HEAT DETECTOR, MINUTES

SPACING = 5.5 m (RADIUS = 3.9 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

CEILING HEIGHT, m

RESPONSE TIME INDEX
TEMPERATURE RISE

(m*s)^{1/2}

	1	2	4	5	6	7	9	10	12	18	24
150	1.12	1.17	1.33	1.41	1.49	1.57	1.73	1.81	1.97	2.46*	2.95*
	1.32	1.39	1.58	1.67	1.77	1.87	2.06	2.15	2.34	2.94*	3.54*
	1.60	1.68	1.91	2.03	2.15	2.27	2.51	2.63	2.87	3.64*	4.42*
	1.80	1.90	2.16	2.30	2.44	2.58	2.86	3.00	3.28	4.20*	5.15*
	1.96	2.08	2.37	2.53	2.68	2.84	3.16	3.32	3.64	4.71*	5.82*
	2.23	2.37	2.72	2.91	3.10	3.29	3.68	3.88	4.28	5.62*	7.04*
	2.34	2.50	2.88	3.08	3.28	3.49	3.92	4.13	4.57	6.04*	7.61*
	2.45	2.61	3.02	3.24	3.46	3.68	4.14	4.37	4.85	6.45*	8.17*
200	1.19	1.25	1.41	1.50	1.58	1.67	1.84	1.92	2.08	2.60*	3.10*
	1.42	1.49	1.69	1.79	1.89	1.99	2.19	2.29	2.48	3.11*	3.73*
	1.72	1.81	2.05	2.18	2.30	2.43	2.68	2.80	3.05	3.84*	4.65*
	1.94	2.05	2.32	2.47	2.61	2.76	3.05	3.19	3.48	4.43*	5.40*
	2.12	2.24	2.55	2.71	2.88	3.04	3.37	3.53	3.86	4.95*	6.07*
	2.42	2.56	2.93	3.12	3.32	3.51	3.91	4.11	4.52	5.87*	7.29*
	2.54	2.70	3.09	3.30	3.51	3.72	4.15	4.37	4.82	6.29*	7.86*
	2.66	2.83	3.25	3.47	3.69	3.92	4.38	4.62	5.10	6.70*	8.41*
250	1.26	1.32	1.49	1.57	1.66	1.75	1.93	2.01	2.18	2.71*	3.24*
	1.50	1.58	1.78	1.89	1.99	2.10	2.30	2.41	2.61	3.26*	3.90*
	1.83	1.92	2.17	2.30	2.43	2.56	2.82	2.95	3.20	4.03*	4.85*
	2.07	2.18	2.46	2.61	2.76	2.91	3.21	3.36	3.66	4.63*	5.62*
	2.26	2.39	2.71	2.87	3.04	3.21	3.55	3.71	4.05	5.16*	6.31*
	2.58	2.73	3.11	3.31	3.51	3.71	4.11	4.32	4.73	6.10*	7.53*
	2.71	2.87	3.28	3.49	3.71	3.93	4.36	4.59	5.03	6.53*	8.10*
	2.84	3.01	3.44	3.67	3.90	4.13	4.60	4.84	5.32	6.94*	8.65*
300	1.31	1.38	1.55	1.64	1.73	1.82	2.00	2.09	2.26	2.82*	3.36*
	1.58	1.65	1.86	1.97	2.08	2.19	2.40	2.51	2.72	3.39*	4.05*
	1.92	2.02	2.28	2.41	2.55	2.68	2.95	3.08	3.34	4.19*	5.04*
	2.18	2.29	2.59	2.74	2.90	3.05	3.36	3.51	3.82	4.81*	5.83*
	2.38	2.51	2.84	3.02	3.19	3.36	3.71	3.88	4.22	5.36*	6.52*
	2.72	2.87	3.26	3.47	3.67	3.88	4.29	4.50	4.92	6.31*	7.76*
	2.86	3.03	3.45	3.67	3.89	4.11	4.55	4.78	5.23	6.74*	8.33*
	2.99	3.17	3.62	3.85	4.09	4.32	4.80	5.04	5.53	7.16*	8.87*
400	1.41	1.48	1.66	1.76	1.85	1.95	2.14	2.23	2.41	2.99*	3.56*
	1.70	1.79	2.01	2.12	2.24	2.35	2.58	2.69	2.91	3.61*	4.31*
	2.09	2.19	2.46	2.61	2.75	2.89	3.17	3.31	3.58	4.47*	5.36*
	2.37	2.49	2.80	2.97	3.13	3.29	3.61	3.77	4.09	5.14*	6.19*
	2.59	2.73	3.08	3.26	3.44	3.63	3.99	4.17	4.52	5.71*	6.91*
	2.96	3.13	3.54	3.75	3.97	4.18	4.61	4.83	5.26	6.69*	8.17*
	3.12	3.30	3.74	3.97	4.20	4.43	4.89	5.12	5.59	7.14*	8.75*
	3.27	3.45	3.92	4.16	4.41	4.65	5.15	5.40	5.89	7.56*	9.30*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.5 m (RADIUS = 3.9 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
0	5	0.75	0.84	1.05	1.16	1.27	1.38	1.60	1.71	1.93	2.60*	3.28*	
	10	0.87	0.99	1.28	1.42	1.56	1.71	2.01	2.16	2.46	3.37*	4.32*	
	20	1.06	1.25	1.66	1.86	2.07	2.28	2.70	2.91	3.34	4.67*	6.05*	
	30	1.23	1.48	1.99	2.25	2.51	2.77	3.30	3.57	4.12	5.81*	7.58*	
	40	1.38	1.69	2.30	2.60	2.91	3.23	3.86	4.18	4.83	6.86*	8.98*	
	60	1.67	2.07	2.86	3.26	3.66	4.06	4.88	5.29	6.14	8.77*	11.54*	
	70	1.80	2.25	3.12	3.56	4.00	4.45	5.35	5.81	6.75	9.67*	12.74*	
	80	1.93	2.43	3.38	3.86	4.34	4.82	5.81	6.31	7.34	10.53*	13.89*	
10	5	0.99	1.05	1.24	1.33	1.43	1.53	1.74	1.84	2.05	2.71*	3.39*	
	10	1.13	1.22	1.46	1.59	1.72	1.85	2.13	2.27	2.56	3.47*	4.40*	
	20	1.34	1.48	1.82	2.01	2.20	2.40	2.80	3.01	3.43	4.75*	6.13*	
	30	1.51	1.69	2.14	2.38	2.63	2.88	3.40	3.66	4.20	5.88*	7.64*	
	40	1.66	1.89	2.44	2.73	3.03	3.33	3.95	4.26	4.91	6.92*	9.04*	
	60	1.93	2.26	2.99	3.37	3.76	4.15	4.96	5.37	6.21	8.83*	11.59*	
	70	2.06	2.43	3.25	3.67	4.10	4.54	5.43	5.89	6.81	9.72*	12.79*	
	80	2.18	2.60	3.50	3.96	4.43	4.91	5.89	6.39	7.40	10.59*	13.94*	
20	5	1.10	1.16	1.35	1.45	1.55	1.65	1.85	1.96	2.16	2.82*	3.49*	
	10	1.27	1.36	1.59	1.72	1.84	1.98	2.25	2.38	2.67	3.56*	4.49*	
	20	1.51	1.64	1.96	2.14	2.32	2.51	2.91	3.11	3.52	4.83*	6.20*	
	30	1.70	1.86	2.28	2.51	2.74	2.99	3.49	3.75	4.28	5.95*	7.71*	
	40	1.86	2.07	2.57	2.85	3.13	3.43	4.04	4.35	4.98	6.99*	9.10*	
	60	2.14	2.43	3.11	3.48	3.86	4.24	5.04	5.44	6.27	8.89*	11.65*	
	70	2.27	2.60	3.37	3.78	4.20	4.63	5.51	5.96	6.88	9.78*	12.84*	
	80	2.40	2.76	3.61	4.06	4.52	4.99	5.96	6.46	7.46	10.64*	14.00*	
50	5	1.29	1.36	1.56	1.67	1.77	1.88	2.09	2.20	2.41	3.08*	3.76*	
	10	1.52	1.61	1.85	1.98	2.12	2.25	2.52	2.66	2.93	3.82*	4.74*	
	20	1.82	1.95	2.28	2.45	2.63	2.81	3.19	3.38	3.78	5.06*	6.42*	
	30	2.05	2.21	2.62	2.83	3.06	3.29	3.76	4.01	4.52	6.16*	7.91*	
	40	2.25	2.44	2.92	3.17	3.44	3.72	4.29	4.59	5.21	7.19*	9.28*	
	60	2.58	2.83	3.46	3.79	4.15	4.51	5.27	5.67	6.48	9.07*	11.82*	
	70	2.73	3.01	3.71	4.08	4.48	4.89	5.74	6.17	7.08	9.95*	13.00*	
	80	2.86	3.18	3.95	4.36	4.80	5.25	6.18	6.67	7.65	10.81*	14.15*	
100	5	1.49	1.57	1.78	1.90	2.01	2.13	2.35	2.47	2.69	3.40*	4.11*	
	10	1.77	1.87	2.14	2.28	2.42	2.56	2.84	2.98	3.27	4.18*	5.11*	
	20	2.15	2.28	2.63	2.81	3.00	3.18	3.56	3.75	4.14	5.42*	6.77*	
	30	2.43	2.60	3.01	3.23	3.46	3.68	4.15	4.39	4.88	6.51*	8.23*	
	40	2.67	2.86	3.34	3.60	3.86	4.13	4.69	4.97	5.56	7.51*	9.59*	
	60	3.06	3.31	3.91	4.24	4.58	4.93	5.65	6.03	6.81	9.37*	12.09*	
	70	3.23	3.50	4.17	4.53	4.91	5.29	6.11	6.53	7.40	10.24*	13.27*	
	80	3.38	3.69	4.42	4.81	5.23	5.65	6.54	7.01	7.97	11.08*	14.41*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.5 m (RADIUS = 3.9 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
150 (m*s) ^{1/2}	5	1.63	1.71	1.94	2.06	2.19	2.31	2.55	2.66	2.90	3.64*	4.38*
	10	1.96	2.06	2.34	2.49	2.64	2.79	3.08	3.23	3.52	4.47*	5.43*
	20	2.39	2.53	2.89	3.08	3.27	3.47	3.86	4.05	4.45	5.74*	7.10*
	30	2.71	2.88	3.31	3.54	3.77	4.00	4.47	4.72	5.20	6.83*	8.54*
	40	2.97	3.17	3.66	3.93	4.19	4.46	5.02	5.30	5.89	7.82*	9.89*
	60	3.41	3.66	4.27	4.60	4.94	5.28	6.00	6.37	7.13	9.66*	12.37*
	70	3.60	3.87	4.55	4.90	5.28	5.66	6.45	6.86	7.71	10.52*	13.53*
	80	3.77	4.07	4.80	5.19	5.60	6.02	6.89	7.34	8.27	11.36*	14.66*
200	5	1.75	1.83	2.07	2.20	2.33	2.45	2.70	2.83	3.07	3.84*	4.61*
	10	2.11	2.22	2.51	2.66	2.82	2.97	3.28	3.43	3.74	4.72*	5.70*
	20	2.58	2.73	3.10	3.30	3.50	3.70	4.10	4.30	4.70	6.03*	7.40*
	30	2.93	3.11	3.55	3.79	4.03	4.26	4.75	4.99	5.49	7.12*	8.84*
	40	3.22	3.42	3.93	4.20	4.47	4.75	5.31	5.60	6.18	8.12*	10.18*
	60	3.69	3.95	4.58	4.91	5.25	5.59	6.31	6.67	7.43	9.94*	12.64*
	70	3.90	4.18	4.86	5.22	5.60	5.98	6.76	7.17	8.01	10.80*	13.80*
	80	4.09	4.39	5.13	5.52	5.93	6.34	7.20	7.65	8.56	11.63*	14.92*
250	5	1.85	1.94	2.19	2.32	2.45	2.58	2.84	2.96	3.21	4.02*	4.81*
	10	2.23	2.35	2.65	2.81	2.97	3.14	3.45	3.61	3.92	4.93*	5.95*
	20	2.75	2.90	3.29	3.49	3.70	3.90	4.32	4.52	4.93	6.28*	7.67*
	30	3.12	3.30	3.77	4.01	4.25	4.50	4.99	5.24	5.74	7.40*	9.13*
	40	3.43	3.64	4.17	4.44	4.72	5.00	5.57	5.86	6.44	8.40*	10.46*
	60	3.94	4.20	4.84	5.18	5.52	5.87	6.59	6.96	7.70	10.21*	12.90*
	70	4.16	4.44	5.14	5.51	5.88	6.27	7.05	7.46	8.29	11.07*	14.05*
	80	4.36	4.67	5.42	5.81	6.22	6.64	7.49	7.94	8.85	11.89*	15.17*
300	5	1.93	2.03	2.29	2.42	2.56	2.69	2.96	3.09	3.34	4.17*	4.99*
	10	2.35	2.46	2.78	2.95	3.11	3.28	3.60	3.77	4.09	5.12*	6.16*
	20	2.89	3.05	3.45	3.66	3.87	4.09	4.51	4.72	5.14	6.52*	7.93*
	30	3.29	3.48	3.95	4.20	4.45	4.70	5.21	5.46	5.96	7.65*	9.40*
	40	3.62	3.83	4.37	4.65	4.94	5.23	5.81	6.10	6.69	8.66*	10.73*
	60	4.15	4.42	5.08	5.42	5.77	6.13	6.85	7.21	7.96	10.48*	13.16*
	70	4.39	4.68	5.39	5.76	6.14	6.53	7.32	7.72	8.55	11.33*	14.31*
	80	4.60	4.91	5.67	6.08	6.49	6.91	7.77	8.21	9.11	12.15*	15.42*
400	5	2.08	2.18	2.46	2.60	2.74	2.88	3.16	3.30	3.57	4.44*	5.30*
	10	2.54	2.67	3.00	3.18	3.35	3.52	3.87	4.04	4.37	5.46*	6.55*
	20	3.14	3.31	3.73	3.96	4.18	4.40	4.84	5.06	5.49	6.93*	8.39*
	30	3.58	3.78	4.28	4.54	4.80	5.06	5.59	5.85	6.37	8.10*	9.89*
	40	3.94	4.17	4.73	5.03	5.32	5.62	6.22	6.52	7.12	9.14*	11.23*
	60	4.53	4.81	5.49	5.85	6.21	6.57	7.31	7.68	8.44	10.98*	13.67*
	70	4.78	5.08	5.82	6.20	6.60	6.99	7.80	8.20	9.03	11.83*	14.81*
	80	5.01	5.34	6.13	6.54	6.96	7.39	8.26	8.70	9.60	12.65*	15.91*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.5 m (RADIUS = 3.9 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	5	1.11	1.26	1.61	1.79	1.97	2.15	2.52	2.70	3.07	4.20*	5.36*	
	10	1.34	1.57	2.06	2.31	2.57	2.82	3.34	3.60	4.13	5.75*	7.43*	
	20	1.72	2.09	2.83	3.20	3.57	3.95	4.72	5.11	5.90	8.35*	10.91*	
	30	2.06	2.55	3.50	3.97	4.45	4.94	5.93	6.43	7.45	10.62*	13.95*	
	40	2.37	2.96	4.11	4.69	5.26	5.85	7.04	7.65	8.88	12.71*	16.75*	
	60	2.94	3.73	5.24	5.99	6.75	7.51	9.08	9.87	11.49	16.54*	21.87*	
	70	3.20	4.09	5.76	6.60	7.44	8.29	10.03	10.91	12.71	18.33*	24.27*	
	80	3.46	4.43	6.27	7.19	8.11	9.04	10.95	11.92	13.89	20.06*	26.58*	
10	5	1.43	1.53	1.83	1.99	2.15	2.32	2.66	2.84	3.20	4.32*	5.47*	
	10	1.67	1.84	2.26	2.49	2.72	2.97	3.46	3.72	4.23	5.84*	7.52*	
	20	2.05	2.33	2.99	3.34	3.71	4.07	4.82	5.21	5.99	8.43*	10.98*	
	30	2.37	2.77	3.65	4.11	4.57	5.05	6.02	6.52	7.53	10.69*	14.02*	
	40	2.67	3.17	4.25	4.81	5.38	5.95	7.13	7.73	8.95	12.78*	16.81*	
	60	3.21	3.92	5.36	6.10	6.85	7.61	9.16	9.95	11.56	16.60*	21.93*	
	70	3.47	4.27	5.88	6.71	7.54	8.38	10.11	10.98	12.78	18.39*	24.32*	
	80	3.72	4.61	6.39	7.29	8.20	9.13	11.02	11.99	13.95	20.12*	26.63*	
20	5	1.59	1.69	1.98	2.14	2.30	2.47	2.80	2.97	3.32	4.42*	5.57*	
	10	1.87	2.03	2.43	2.65	2.87	3.10	3.59	3.83	4.34	5.94*	7.60*	
	20	2.29	2.54	3.15	3.49	3.84	4.19	4.93	5.31	6.08	8.50*	11.05*	
	30	2.62	2.97	3.79	4.24	4.69	5.16	6.12	6.61	7.61	10.77*	14.08*	
	40	2.92	3.37	4.39	4.93	5.49	6.05	7.22	7.81	9.03	12.85*	16.87*	
	60	3.47	4.10	5.49	6.21	6.95	7.70	9.24	10.02	11.63	16.66*	21.99*	
	70	3.72	4.44	6.01	6.81	7.64	8.47	10.18	11.06	12.84	18.45*	24.38*	
	80	3.96	4.78	6.51	7.39	8.30	9.22	11.10	12.06	14.01	20.17*	26.68*	
50	5	1.88	1.99	2.30	2.46	2.62	2.79	3.13	3.30	3.64	4.73*	5.87*	
	10	2.24	2.40	2.80	3.02	3.24	3.46	3.92	4.16	4.64	6.21*	7.86*	
	20	2.75	2.98	3.56	3.88	4.20	4.54	5.24	5.60	6.34	8.74*	11.27*	
	30	3.14	3.45	4.20	4.61	5.04	5.48	6.40	6.88	7.85	10.98*	14.28*	
	40	3.48	3.86	4.79	5.29	5.81	6.36	7.48	8.06	9.25	13.05*	17.06*	
	60	4.06	4.60	5.86	6.54	7.25	7.98	9.48	10.25	11.83	16.84*	22.15*	
	70	4.33	4.94	6.36	7.13	7.92	8.74	10.41	11.28	13.04	18.62*	24.54*	
	80	4.58	5.27	6.85	7.70	8.58	9.47	11.32	12.27	14.21	20.34*	26.84*	
100	5	2.18	2.30	2.63	2.81	2.98	3.16	3.51	3.68	4.03	5.16*	6.31*	
	10	2.63	2.80	3.22	3.44	3.67	3.90	4.37	4.60	5.08	6.64*	8.28*	
	20	3.25	3.48	4.07	4.38	4.70	5.03	5.70	6.05	6.76	9.12*	11.63*	
	30	3.71	4.01	4.75	5.14	5.55	5.97	6.85	7.31	8.25	11.33*	14.61*	
	40	4.10	4.47	5.35	5.82	6.32	6.84	7.91	8.47	9.62	13.37*	17.36*	
	60	4.76	5.25	6.42	7.06	7.73	8.42	9.87	10.62	12.17	17.14*	22.43*	
	70	5.05	5.61	6.92	7.64	8.39	9.17	10.80	11.64	13.36	18.91*	24.80*	
	80	5.33	5.95	7.41	8.20	9.03	9.90	11.69	12.62	14.52	20.62*	27.10*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.5 m (RADIUS = 3.9 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	2.40	2.53	2.88	3.06	3.25	3.43	3.80	3.98	4.34	5.51*	6.69*
	10	2.92	3.09	3.53	3.76	4.00	4.24	4.71	4.95	5.44	7.02*	8.67*
	20	3.61	3.85	4.45	4.77	5.09	5.42	6.10	6.45	7.15	9.49*	11.99*
	30	4.13	4.43	5.17	5.57	5.98	6.40	7.26	7.71	8.63	11.67*	14.94*
	40	4.56	4.92	5.80	6.28	6.77	7.27	8.32	8.86	9.99	13.70*	17.67*
	60	5.28	5.76	6.91	7.53	8.18	8.85	10.26	10.99	12.50	17.44*	22.71*
	70	5.60	6.14	7.42	8.11	8.84	9.59	11.17	11.99	13.69	19.19*	25.07*
	80	5.90	6.49	7.90	8.67	9.47	10.31	12.05	12.96	14.83	20.89*	27.36*
200	5	2.58	2.71	3.08	3.27	3.46	3.65	4.03	4.22	4.59	5.80*	7.01*
	10	3.15	3.32	3.78	4.03	4.27	4.52	5.01	5.25	5.75	7.36*	9.03*
	20	3.90	4.15	4.77	5.10	5.43	5.76	6.45	6.79	7.50	9.84*	12.33*
	30	4.47	4.78	5.54	5.94	6.35	6.77	7.63	8.07	8.98	12.01*	15.26*
	40	4.94	5.30	6.19	6.67	7.16	7.66	8.69	9.23	10.34	14.02*	17.97*
	60	5.72	6.19	7.34	7.95	8.59	9.25	10.63	11.35	12.83	17.73*	22.98*
	70	6.05	6.59	7.85	8.54	9.25	9.99	11.53	12.34	14.01	19.48*	25.34*
	80	6.37	6.96	8.35	9.10	9.89	10.70	12.41	13.30	15.15	21.17*	27.61*
250	5	2.73	2.87	3.25	3.45	3.65	3.84	4.24	4.43	4.81	6.06*	7.30*
	10	3.34	3.53	4.00	4.25	4.51	4.76	5.26	5.51	6.02	7.66*	9.36*
	20	4.16	4.41	5.05	5.38	5.72	6.06	6.76	7.11	7.81	10.18*	12.67*
	30	4.76	5.07	5.85	6.26	6.68	7.10	7.97	8.41	9.31	12.34*	15.57*
	40	5.26	5.63	6.54	7.01	7.51	8.01	9.04	9.57	10.67	14.33*	18.27*
	60	6.09	6.57	7.72	8.33	8.97	9.62	10.98	11.69	13.15	18.02*	23.26*
	70	6.45	6.98	8.25	8.93	9.63	10.36	11.89	12.68	14.32	19.76*	25.60*
	80	6.78	7.36	8.75	9.50	10.27	11.08	12.76	13.64	15.45	21.44*	27.87*
300	5	2.87	3.01	3.40	3.61	3.81	4.01	4.42	4.61	5.01	6.29*	7.56*
	10	3.52	3.70	4.20	4.46	4.71	4.97	5.49	5.75	6.26	7.94*	9.66*
	20	4.38	4.64	5.29	5.64	5.98	6.33	7.03	7.39	8.10	10.49*	12.99*
	30	5.02	5.34	6.13	6.55	6.97	7.40	8.27	8.72	9.62	12.65*	15.89*
	40	5.54	5.92	6.84	7.33	7.82	8.33	9.36	9.90	10.99	14.64*	18.57*
	60	6.42	6.90	8.06	8.68	9.31	9.96	11.32	12.02	13.47	18.31*	23.53*
	70	6.79	7.33	8.60	9.28	9.99	10.71	12.22	13.01	14.63	20.04*	25.86*
	80	7.14	7.73	9.12	9.86	10.63	11.43	13.09	13.96	15.75	21.71*	28.12*
400	5	3.10	3.25	3.66	3.88	4.09	4.31	4.73	4.94	5.35	6.69*	8.02*
	10	3.81	4.01	4.53	4.80	5.08	5.35	5.89	6.15	6.68	8.43*	10.21*
	20	4.76	5.04	5.72	6.08	6.44	6.80	7.53	7.89	8.62	11.06*	13.59*
	30	5.46	5.80	6.62	7.05	7.49	7.93	8.82	9.27	10.18	13.25*	16.49*
	40	6.04	6.43	7.38	7.88	8.39	8.90	9.95	10.48	11.57	15.23*	19.15*
	60	6.99	7.48	8.67	9.29	9.93	10.59	11.94	12.63	14.06	18.88*	24.07*
	70	7.40	7.94	9.24	9.92	10.63	11.35	12.85	13.63	15.22	20.59*	26.39*
	80	7.77	8.37	9.77	10.52	11.29	12.08	13.73	14.58	16.34	22.25*	28.63*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.5 m (RADIUS = 3.9 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	5	1.69	1.97	2.58	2.88	3.19	3.51	4.14	4.46	5.10	7.09*	9.14*	
	10	2.15	2.59	3.48	3.94	4.39	4.85	5.78	6.25	7.21	10.18*	13.27*	
	20	2.92	3.63	5.01	5.70	6.40	7.11	8.54	9.27	10.75	15.37*	20.22*	
	30	3.59	4.54	6.35	7.25	8.17	9.09	10.96	11.92	13.86	19.93*	26.32*	
	40	4.21	5.38	7.58	8.68	9.79	10.91	13.19	14.35	16.71	24.11*	31.91*	
	60	5.35	6.91	9.83	11.28	12.75	14.24	17.26	18.80	21.94	31.77*	42.16*	
	70	5.88	7.62	10.88	12.50	14.14	15.79	19.16	20.88	24.38	35.35*	46.95*	
	80	6.39	8.31	11.90	13.68	15.48	17.29	21.00	22.89	26.73	38.80*	51.57*	
10	5	2.09	2.29	2.81	3.09	3.38	3.68	4.29	4.60	5.23	7.20*	9.24*	
	10	2.54	2.88	3.68	4.11	4.55	5.00	5.91	6.37	7.32	10.27*	13.36*	
	20	3.27	3.88	5.18	5.85	6.54	7.23	8.65	9.37	10.84	15.45*	20.30*	
	30	3.92	4.76	6.50	7.39	8.29	9.20	11.06	12.01	13.94	20.00*	26.38*	
	40	4.52	5.58	7.72	8.80	9.90	11.01	13.28	14.43	16.79	24.18*	31.97*	
	60	5.63	7.10	9.96	11.40	12.85	14.33	17.34	18.88	22.01	31.83*	42.22*	
	70	6.15	7.80	11.00	12.61	14.24	15.88	19.24	20.95	24.45	35.41*	47.00*	
	80	6.65	8.49	12.01	13.78	15.57	17.38	21.08	22.96	26.80	38.86*	51.62*	
20	5	2.33	2.51	3.01	3.28	3.56	3.84	4.43	4.74	5.36	7.31*	9.35*	
	10	2.82	3.12	3.87	4.28	4.70	5.14	6.03	6.49	7.43	10.37*	13.45*	
	20	3.58	4.11	5.34	6.00	6.67	7.35	8.76	9.47	10.93	15.53*	20.37*	
	30	4.22	4.98	6.65	7.52	8.41	9.31	11.16	12.10	14.02	20.07*	26.45*	
	40	4.81	5.79	7.86	8.93	10.01	11.11	13.37	14.52	16.87	24.24*	32.04*	
	60	5.90	7.28	10.08	11.51	12.96	14.42	17.42	18.95	22.07	31.89*	42.27*	
	70	6.41	7.98	11.13	12.72	14.33	15.97	19.32	21.03	24.51	35.46*	47.06*	
	80	6.91	8.66	12.13	13.89	15.67	17.47	21.15	23.03	26.86	38.91*	51.67*	
50	5	2.77	2.96	3.45	3.72	3.99	4.27	4.83	5.13	5.72	7.64*	9.65*	
	10	3.37	3.65	4.36	4.74	5.14	5.55	6.40	6.84	7.74	10.64*	13.71*	
	20	4.24	4.70	5.81	6.42	7.06	7.71	9.07	9.77	11.20	15.77*	20.59*	
	30	4.93	5.57	7.09	7.91	8.76	9.64	11.44	12.37	14.27	20.28*	26.65*	
	40	5.55	6.37	8.27	9.29	10.34	11.42	13.63	14.77	17.09	24.44*	32.22*	
	60	6.64	7.83	10.46	11.84	13.26	14.70	17.66	19.18	22.28	32.07*	42.44*	
	70	7.14	8.51	11.49	13.04	14.63	16.24	19.55	21.25	24.71	35.64*	47.22*	
	80	7.63	9.18	12.49	14.20	15.95	17.73	21.38	23.24	27.05	39.08*	51.83*	
100	5	3.23	3.43	3.95	4.23	4.51	4.79	5.36	5.65	6.24	8.15*	10.15*	
	10	3.96	4.25	4.96	5.34	5.73	6.13	6.95	7.37	8.24	11.10*	14.14*	
	20	4.98	5.42	6.48	7.06	7.66	8.28	9.58	10.25	11.64	16.16*	20.95*	
	30	5.76	6.35	7.76	8.53	9.34	10.17	11.91	12.81	14.67	20.64*	26.98*	
	40	6.44	7.18	8.93	9.89	10.89	11.92	14.07	15.18	17.47	24.77*	32.53*	
	60	7.60	8.65	11.08	12.39	13.75	15.16	18.06	19.56	22.62	32.37*	42.72*	
	70	8.13	9.33	12.09	13.57	15.11	16.68	19.94	21.61	25.04	35.92*	47.49*	
	80	8.63	9.98	13.06	14.71	16.41	18.15	21.75	23.59	27.37	39.36*	52.09*	

SPACING = 5.5 m (RADIUS = 3.9 m)
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TEMPERATURE
 TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C												
		1	2	4	5	6	7	9	10	12	18	24	
150	5	3.57	3.78	4.32	4.61	4.90	5.19	5.78	6.07	6.67	8.60*	10.61*	
	10	4.39	4.68	5.42	5.80	6.20	6.60	7.43	7.85	8.70	11.54*	14.56*	
	20	5.52	5.96	7.03	7.60	8.19	8.80	10.06	10.72	12.08	16.54*	21.32*	
	30	6.39	6.96	8.34	9.09	9.87	10.68	12.37	13.25	15.07	20.99*	27.31*	
	40	7.12	7.83	9.52	10.44	11.41	12.41	14.51	15.59	17.84	25.10*	32.84*	
	60	8.36	9.35	11.66	12.92	14.24	15.61	18.46	19.93	22.96	32.66*	43.00*	
	70	8.92	10.04	12.66	14.09	15.58	17.12	20.32	21.97	25.36	36.21*	47.75*	
	80	9.44	10.70	13.63	15.22	16.87	18.58	22.12	23.94	27.69	39.64*	52.35*	
200	5	3.84	4.06	4.62	4.92	5.22	5.52	6.13	6.43	7.03	9.01*	11.04*	
	10	4.74	5.04	5.80	6.19	6.60	7.01	7.84	8.26	9.12	11.96*	14.97*	
	20	5.97	6.41	7.49	8.06	8.65	9.26	10.51	11.16	12.49	16.92*	21.67*	
	30	6.90	7.47	8.85	9.59	10.36	11.15	12.81	13.67	15.46	21.34*	27.63*	
	40	7.68	8.38	10.05	10.96	11.90	12.88	14.93	16.00	18.21	25.43*	33.14*	
	60	9.00	9.95	12.20	13.43	14.72	16.05	18.85	20.30	23.30	32.96*	43.27*	
	70	9.58	10.66	13.20	14.59	16.04	17.55	20.70	22.33	25.69	36.50*	48.02*	
	80	10.13	11.34	14.17	15.71	17.33	19.00	22.49	24.29	28.00	39.91*	52.61*	
250	5	4.08	4.30	4.88	5.19	5.50	5.81	6.43	6.74	7.35	9.37*	11.43*	
	10	5.04	5.35	6.12	6.53	6.95	7.36	8.20	8.63	9.49	12.35*	15.37*	
	20	6.35	6.80	7.89	8.47	9.07	9.67	10.92	11.57	12.89	17.30*	22.03*	
	30	7.34	7.91	9.30	10.04	10.80	11.59	13.23	14.08	15.84	21.68*	27.96*	
	40	8.16	8.86	10.53	11.43	12.36	13.32	15.34	16.40	18.57	25.75*	33.45*	
	60	9.55	10.49	12.71	13.92	15.18	16.49	19.24	20.67	23.63	33.26*	43.55*	
	70	10.16	11.22	13.71	15.07	16.50	17.97	21.07	22.69	26.01	36.78*	48.29*	
	80	10.73	11.91	14.68	16.19	17.77	19.41	22.85	24.64	28.32	40.19*	52.87*	
300	5	4.28	4.51	5.11	5.43	5.75	6.07	6.70	7.01	7.64	9.70*	11.79*	
	10	5.31	5.62	6.42	6.83	7.26	7.68	8.54	8.97	9.84	12.72*	15.75*	
	20	6.69	7.15	8.26	8.85	9.45	10.06	11.31	11.95	13.26	17.66*	22.38*	
	30	7.73	8.31	9.71	10.45	11.22	12.00	13.63	14.47	16.21	22.03*	28.28*	
	40	8.60	9.30	10.97	11.86	12.79	13.74	15.74	16.78	18.93	26.07*	33.75*	
	60	10.04	10.98	13.18	14.37	15.62	16.91	19.62	21.04	23.97	33.55*	43.83*	
	70	10.68	11.73	14.19	15.53	16.93	18.39	21.45	23.04	26.34	37.07*	48.55*	
	80	11.27	12.44	15.16	16.65	18.21	19.82	23.22	24.98	28.63	40.47*	53.12*	
400	5	4.64	4.88	5.51	5.85	6.18	6.51	7.17	7.50	8.15	10.28*	12.44*	
	10	5.77	6.09	6.93	7.36	7.80	8.24	9.12	9.56	10.45	13.40*	16.47*	
	20	7.28	7.75	8.90	9.50	10.11	10.74	12.00	12.65	13.96	18.37*	23.08*	
	30	8.41	9.00	10.43	11.18	11.96	12.74	14.37	15.20	16.92	22.70*	28.93*	
	40	9.35	10.05	11.74	12.64	13.57	14.52	16.50	17.52	19.63	26.72*	34.35*	
	60	10.91	11.84	14.03	15.21	16.44	17.71	20.36	21.75	24.62	34.14*	44.38*	
	70	11.58	12.62	15.07	16.39	17.76	19.18	22.18	23.74	26.97	37.63*	49.08*	
	80	12.22	13.36	16.05	17.51	19.03	20.61	23.93	25.66	29.25	41.02*	53.64*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 m (RADIUS = 4.2 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	°C												
	5	0.57	0.61	0.74	0.81	0.88	0.95	1.09	1.16	1.29	1.71*	2.13*	
	10	0.63	0.70	0.86	0.95	1.04	1.12	1.30	1.39	1.57	2.11*	2.66*	
	20	0.73	0.84	1.06	1.18	1.30	1.42	1.66	1.78	2.02	2.77*	3.54*	
	30	0.82	0.96	1.24	1.38	1.53	1.68	1.97	2.12	2.42	3.36*	4.32*	
	40	0.91	1.07	1.40	1.57	1.74	1.91	2.26	2.44	2.79	3.89*	5.03*	
	60	1.06	1.27	1.70	1.91	2.13	2.35	2.79	3.01	3.47	4.87*	6.34*	
	80	1.13	1.37	1.84	2.07	2.31	2.55	3.04	3.28	3.78	5.33*	6.95*	
10	5	1.20	1.46	1.97	2.23	2.49	2.75	3.27	3.54	4.08	5.77*	7.54*	
	5	0.75	0.78	0.90	0.96	1.02	1.09	1.22	1.28	1.42	1.82*	2.23*	
	10	0.84	0.88	1.02	1.10	1.18	1.26	1.42	1.51	1.67	2.20*	2.74*	
	20	0.97	1.03	1.22	1.32	1.43	1.54	1.77	1.88	2.12	2.85*	3.61*	
	30	1.07	1.15	1.39	1.52	1.65	1.79	2.07	2.21	2.51	3.43*	4.38*	
	40	1.15	1.26	1.54	1.70	1.86	2.02	2.35	2.52	2.87	3.96*	5.09*	
	60	1.31	1.46	1.83	2.03	2.23	2.44	2.87	3.09	3.54	4.93*	6.39*	
	80	1.38	1.55	1.96	2.18	2.41	2.64	3.12	3.36	3.85	5.39*	7.00*	
20	5	1.44	1.64	2.09	2.34	2.58	2.84	3.35	3.61	4.15	5.83*	7.59*	
	5	0.82	0.86	0.98	1.04	1.11	1.17	1.31	1.37	1.51	1.91*	2.32*	
	10	0.93	0.98	1.12	1.20	1.28	1.36	1.52	1.60	1.77	2.29*	2.83*	
	20	1.09	1.15	1.34	1.44	1.54	1.65	1.87	1.98	2.20	2.93*	3.69*	
	30	1.20	1.29	1.51	1.63	1.76	1.89	2.16	2.30	2.59	3.50*	4.45*	
	40	1.30	1.40	1.67	1.81	1.96	2.12	2.44	2.61	2.95	4.02*	5.15*	
	60	1.47	1.61	1.95	2.14	2.33	2.54	2.95	3.17	3.61	4.99*	6.45*	
	80	1.55	1.70	2.08	2.29	2.51	2.73	3.19	3.43	3.92	5.44*	7.05*	
50	5	1.62	1.79	2.21	2.44	2.68	2.92	3.43	3.69	4.22	5.88*	7.64*	
	5	0.95	1.00	1.12	1.19	1.27	1.34	1.48	1.55	1.69	2.11*	2.54*	
	10	1.10	1.16	1.31	1.39	1.48	1.56	1.73	1.81	1.98	2.51*	3.06*	
	20	1.31	1.37	1.57	1.67	1.78	1.89	2.10	2.21	2.44	3.15*	3.90*	
	30	1.46	1.54	1.77	1.89	2.02	2.15	2.41	2.54	2.82	3.70*	4.64*	
	40	1.58	1.68	1.94	2.08	2.23	2.38	2.69	2.84	3.17	4.22*	5.34*	
	60	1.79	1.92	2.24	2.42	2.60	2.79	3.19	3.39	3.81	5.17*	6.61*	
	80	1.88	2.02	2.38	2.58	2.78	2.99	3.42	3.65	4.11	5.61*	7.21*	
100	5	1.96	2.12	2.51	2.72	2.94	3.17	3.65	3.90	4.41	6.05*	7.79*	
	5	1.09	1.14	1.28	1.35	1.43	1.51	1.66	1.73	1.88	2.34*	2.80*	
	10	1.28	1.34	1.51	1.60	1.69	1.78	1.96	2.05	2.23	2.78*	3.35*	
	20	1.53	1.61	1.82	1.93	2.04	2.15	2.38	2.50	2.72	3.45*	4.21*	
	30	1.72	1.81	2.05	2.18	2.31	2.45	2.72	2.85	3.13	4.01*	4.95*	
	40	1.87	1.98	2.25	2.40	2.55	2.70	3.01	3.17	3.49	4.52*	5.63*	
	60	2.12	2.25	2.59	2.77	2.95	3.14	3.53	3.72	4.13	5.45*	6.89*	
	80	2.23	2.38	2.74	2.93	3.13	3.34	3.76	3.98	4.43	5.89*	7.48*	
80	2.33	2.49	2.88	3.09	3.31	3.53	3.99	4.23	4.72	6.32*	8.05*		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 m (RADIUS = 4.2 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 (m*s) ^{1/2}	°C												
	5	1.19	1.24	1.39	1.47	1.55	1.63	1.79	1.87	2.02	2.50*	2.99*	2.99*
	10	1.41	1.47	1.65	1.74	1.84	1.93	2.12	2.22	2.41	2.99*	3.59*	3.59*
	20	1.70	1.78	2.00	2.12	2.23	2.35	2.59	2.71	2.95	3.70*	4.48*	4.48*
	30	1.91	2.00	2.26	2.40	2.54	2.67	2.95	3.09	3.37	4.28*	5.23*	5.23*
	40	2.08	2.19	2.48	2.63	2.79	2.95	3.26	3.42	3.75	4.79*	5.91*	5.91*
	60	2.37	2.50	2.85	3.04	3.22	3.41	3.80	4.00	4.41	5.73*	7.15*	7.15*
	70	2.49	2.64	3.01	3.21	3.42	3.62	4.05	4.26	4.71	6.16*	7.73*	7.73*
200	80	2.60	2.76	3.16	3.38	3.60	3.82	4.28	4.52	5.00	6.58*	8.30*	8.30*
	5	1.27	1.32	1.48	1.56	1.65	1.73	1.90	1.98	2.14	2.64*	3.14*	3.14*
	10	1.51	1.58	1.76	1.86	1.96	2.06	2.26	2.36	2.55	3.16*	3.78*	3.78*
	20	1.83	1.91	2.15	2.27	2.39	2.52	2.76	2.89	3.13	3.91*	4.71*	4.71*
	30	2.06	2.16	2.43	2.57	2.72	2.86	3.15	3.29	3.58	4.51*	5.48*	5.48*
	40	2.26	2.37	2.67	2.83	2.99	3.15	3.48	3.64	3.97	5.04*	6.16*	6.16*
	60	2.57	2.71	3.07	3.26	3.45	3.65	4.04	4.24	4.65	5.98*	7.40*	7.40*
	70	2.70	2.85	3.24	3.44	3.65	3.86	4.29	4.51	4.96	6.41*	7.98*	7.98*
250	80	2.82	2.99	3.40	3.62	3.84	4.07	4.53	4.77	5.25	6.83*	8.55*	8.55*
	5	1.34	1.39	1.55	1.64	1.73	1.81	1.99	2.07	2.24	2.76*	3.28*	3.28*
	10	1.60	1.67	1.86	1.96	2.07	2.17	2.38	2.48	2.68	3.31*	3.95*	3.95*
	20	1.95	2.03	2.27	2.40	2.53	2.66	2.91	3.04	3.29	4.09*	4.92*	4.92*
	30	2.20	2.30	2.58	2.72	2.87	3.02	3.32	3.47	3.76	4.71*	5.70*	5.70*
	40	2.40	2.52	2.83	3.00	3.16	3.33	3.66	3.83	4.17	5.25*	6.40*	6.40*
	60	2.74	2.88	3.25	3.45	3.65	3.85	4.25	4.46	4.87	6.21*	7.64*	7.64*
	70	2.88	3.04	3.43	3.65	3.86	4.08	4.51	4.73	5.18	6.65*	8.22*	8.22*
300	80	3.01	3.18	3.60	3.83	4.06	4.29	4.76	5.00	5.48	7.07*	8.78*	8.78*
	5	1.40	1.45	1.62	1.71	1.80	1.89	2.07	2.15	2.33	2.86*	3.40*	3.40*
	10	1.68	1.75	1.95	2.05	2.16	2.27	2.48	2.59	2.79	3.44*	4.10*	4.10*
	20	2.05	2.13	2.38	2.52	2.65	2.78	3.04	3.18	3.43	4.26*	5.11*	5.11*
	30	2.31	2.42	2.71	2.86	3.01	3.17	3.47	3.62	3.93	4.90*	5.91*	5.91*
	40	2.53	2.65	2.97	3.14	3.32	3.49	3.83	4.00	4.34	5.45*	6.61*	6.61*
	60	2.89	3.03	3.42	3.62	3.82	4.03	4.44	4.65	5.06	6.42*	7.87*	7.87*
	70	3.04	3.20	3.61	3.82	4.04	4.26	4.71	4.93	5.39	6.87*	8.45*	8.45*
400	80	3.18	3.35	3.79	4.02	4.25	4.49	4.96	5.20	5.69	7.29*	9.01*	9.01*
	5	1.50	1.56	1.74	1.83	1.93	2.02	2.21	2.30	2.48	3.04*	3.61*	3.61*
	10	1.81	1.88	2.10	2.21	2.32	2.44	2.66	2.77	2.99	3.67*	4.36*	4.36*
	20	2.22	2.31	2.58	2.72	2.86	3.00	3.27	3.41	3.68	4.54*	5.43*	5.43*
	30	2.51	2.63	2.93	3.09	3.25	3.41	3.73	3.89	4.21	5.22*	6.27*	6.27*
	40	2.76	2.88	3.22	3.40	3.58	3.76	4.12	4.30	4.66	5.80*	7.00*	7.00*
	60	3.15	3.30	3.70	3.91	4.13	4.34	4.77	4.98	5.41	6.81*	8.29*	8.29*
	70	3.32	3.48	3.91	4.14	4.36	4.59	5.05	5.29	5.75	7.26*	8.88*	8.88*
80	3.47	3.65	4.10	4.34	4.59	4.83	5.32	5.57	6.07	7.70*	9.44*	9.44*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 m (RADIUS = 4.2 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
0 (m*s) ^{1/2}	°C											
	5	0.81	0.89	1.10	1.21	1.32	1.43	1.65	1.76	1.98	2.65*	3.34*
	10	0.93	1.06	1.34	1.48	1.63	1.78	2.07	2.22	2.52	3.44*	4.39*
	20	1.14	1.34	1.74	1.95	2.16	2.37	2.79	3.00	3.44	4.77*	6.16*
	30	1.32	1.58	2.10	2.36	2.62	2.88	3.42	3.69	4.24	5.94*	7.71*
	40	1.49	1.80	2.42	2.73	3.04	3.36	3.99	4.32	4.97	7.01*	9.14*
	60	1.80	2.21	3.01	3.41	3.82	4.23	5.05	5.47	6.32	8.97*	11.75*
	70	1.94	2.40	3.29	3.74	4.18	4.63	5.55	6.01	6.95	9.89*	12.97*
10	80	2.08	2.59	3.56	4.04	4.53	5.02	6.02	6.53	7.56	10.77*	14.15*
	5	1.06	1.12	1.29	1.39	1.49	1.59	1.79	1.90	2.11	2.76*	3.44*
	10	1.21	1.29	1.53	1.65	1.79	1.92	2.20	2.34	2.63	3.54*	4.48*
	20	1.43	1.57	1.91	2.10	2.29	2.49	2.90	3.11	3.53	4.85*	6.23*
	30	1.62	1.80	2.25	2.49	2.74	2.99	3.52	3.78	4.32	6.01*	7.78*
	40	1.78	2.01	2.56	2.86	3.16	3.46	4.09	4.40	5.05	7.08*	9.20*
	60	2.07	2.40	3.14	3.53	3.92	4.32	5.13	5.55	6.39	9.03*	11.81*
	70	2.20	2.59	3.42	3.85	4.28	4.72	5.63	6.08	7.02	9.95*	13.02*
20	80	2.34	2.77	3.68	4.15	4.63	5.11	6.10	6.60	7.63	10.83*	14.20*
	5	1.17	1.23	1.41	1.51	1.61	1.71	1.91	2.01	2.22	2.87*	3.54*
	10	1.35	1.43	1.66	1.79	1.92	2.05	2.32	2.46	2.74	3.63*	4.56*
	20	1.61	1.73	2.06	2.23	2.42	2.61	3.00	3.21	3.62	4.93*	6.31*
	30	1.81	1.97	2.39	2.62	2.86	3.11	3.61	3.87	4.41	6.08*	7.84*
	40	1.98	2.19	2.70	2.98	3.27	3.57	4.18	4.49	5.13	7.14*	9.26*
	60	2.29	2.58	3.27	3.64	4.02	4.42	5.22	5.63	6.46	9.09*	11.86*
	70	2.43	2.76	3.54	3.96	4.38	4.81	5.70	6.16	7.09	10.00*	13.08*
50	80	2.56	2.94	3.80	4.26	4.72	5.20	6.18	6.67	7.69	10.88*	14.25*
	5	1.38	1.44	1.63	1.74	1.84	1.95	2.16	2.26	2.48	3.13*	3.81*
	10	1.62	1.70	1.94	2.07	2.20	2.33	2.60	2.74	3.01	3.89*	4.81*
	20	1.94	2.06	2.38	2.56	2.74	2.92	3.30	3.49	3.88	5.16*	6.52*
	30	2.19	2.34	2.74	2.96	3.18	3.41	3.89	4.14	4.65	6.29*	8.04*
	40	2.40	2.58	3.06	3.32	3.59	3.86	4.44	4.74	5.36	7.34*	9.45*
	60	2.75	3.00	3.63	3.97	4.32	4.69	5.46	5.86	6.67	9.27*	12.03*
	70	2.91	3.19	3.89	4.27	4.67	5.08	5.94	6.38	7.29	10.18*	13.24*
100	80	3.05	3.37	4.14	4.57	5.01	5.46	6.40	6.89	7.89	11.05*	14.41*
	5	1.59	1.65	1.86	1.98	2.09	2.20	2.43	2.54	2.76	3.46*	4.16*
	10	1.89	1.98	2.23	2.37	2.51	2.65	2.93	3.07	3.36	4.25*	5.19*
	20	2.29	2.41	2.75	2.93	3.12	3.30	3.68	3.87	4.26	5.52*	6.87*
	30	2.59	2.74	3.15	3.37	3.60	3.82	4.29	4.53	5.03	6.63*	8.37*
	40	2.84	3.02	3.50	3.75	4.02	4.29	4.85	5.13	5.73	7.66*	9.75*
	60	3.25	3.50	4.10	4.43	4.77	5.12	5.85	6.23	7.01	9.56*	12.30*
	70	3.43	3.70	4.37	4.74	5.11	5.50	6.32	6.74	7.62	10.46*	13.50*
80	3.60	3.90	4.63	5.03	5.45	5.88	6.78	7.24	8.21	11.33*	14.66*	

SPACING = 6.0 m (RADIUS = 4.2 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE	CEILING HEIGHT, m										
			1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2} 150	°C												
	5	1.74	1.81	2.03	2.15	2.27	2.39	2.63	2.74	2.98	3.70*	4.44*	
	10	2.08	2.18	2.45	2.60	2.74	2.89	3.18	3.33	3.62	4.55*	5.51*	
	20	2.54	2.67	3.02	3.21	3.40	3.60	3.98	4.18	4.57	5.85*	7.20*	
	30	2.88	3.04	3.46	3.69	3.92	4.15	4.62	4.87	5.36	6.96*	8.68*	
	40	3.16	3.35	3.84	4.10	4.36	4.64	5.19	5.48	6.06	7.98*	10.05*	
	60	3.62	3.87	4.48	4.80	5.14	5.49	6.20	6.58	7.34	9.86*	12.58*	
	70	3.82	4.09	4.76	5.12	5.50	5.88	6.67	7.09	7.94	10.74*	13.77*	
200	80	4.01	4.31	5.03	5.43	5.83	6.25	7.13	7.58	8.52	11.60*	14.92*	
	5	1.86	1.94	2.17	2.29	2.42	2.54	2.79	2.91	3.15	3.91*	4.67*	
	10	2.24	2.34	2.63	2.78	2.93	3.08	3.39	3.54	3.84	4.80*	5.78*	
	20	2.74	2.88	3.25	3.44	3.64	3.84	4.24	4.44	4.84	6.14*	7.51*	
	30	3.12	3.28	3.72	3.95	4.19	4.43	4.91	5.15	5.65	7.26*	8.98*	
	40	3.42	3.62	4.12	4.38	4.66	4.93	5.49	5.78	6.36	8.27*	10.34*	
	60	3.93	4.17	4.79	5.12	5.46	5.81	6.52	6.89	7.65	10.14*	12.85*	
	70	4.14	4.41	5.09	5.46	5.83	6.21	7.00	7.41	8.24	11.02*	14.03*	
250	80	4.34	4.64	5.37	5.77	6.17	6.59	7.45	7.90	8.82	11.87*	15.17*	
	5	1.97	2.05	2.29	2.42	2.54	2.67	2.93	3.05	3.30	4.08*	4.87*	
	10	2.38	2.48	2.78	2.93	3.09	3.25	3.56	3.72	4.03	5.01*	6.03*	
	20	2.92	3.06	3.44	3.64	3.85	4.05	4.46	4.66	5.07	6.39*	7.78*	
	30	3.32	3.49	3.94	4.18	4.42	4.66	5.16	5.40	5.90	7.53*	9.27*	
	40	3.65	3.84	4.36	4.63	4.91	5.19	5.76	6.05	6.63	8.55*	10.62*	
	60	4.18	4.44	5.07	5.41	5.75	6.10	6.82	7.18	7.93	10.42*	13.11*	
	70	4.42	4.69	5.38	5.75	6.12	6.51	7.30	7.70	8.53	11.29*	14.29*	
300	80	4.63	4.93	5.67	6.07	6.48	6.89	7.75	8.20	9.11	12.13*	15.43*	
	5	2.06	2.14	2.39	2.52	2.66	2.79	3.05	3.18	3.44	4.24*	5.05*	
	10	2.49	2.60	2.91	3.07	3.23	3.40	3.72	3.88	4.20	5.21*	6.25*	
	20	3.07	3.22	3.61	3.82	4.03	4.24	4.66	4.87	5.28	6.63*	8.04*	
	30	3.50	3.67	4.14	4.38	4.63	4.88	5.38	5.63	6.14	7.79*	9.54*	
	40	3.84	4.05	4.58	4.86	5.14	5.42	6.00	6.29	6.88	8.82*	10.89*	
	60	4.41	4.67	5.31	5.66	6.01	6.36	7.08	7.45	8.20	10.68*	13.38*	
	70	4.66	4.94	5.64	6.01	6.39	6.78	7.57	7.97	8.80	11.55*	14.55*	
400	80	4.89	5.19	5.94	6.34	6.76	7.17	8.03	8.48	9.38	12.39*	15.68*	
	5	2.22	2.31	2.57	2.71	2.85	2.99	3.26	3.40	3.67	4.51*	5.36*	
	10	2.70	2.81	3.14	3.31	3.48	3.65	3.99	4.16	4.50	5.55*	6.64*	
	20	3.34	3.49	3.91	4.12	4.34	4.56	5.00	5.22	5.65	7.05*	8.51*	
	30	3.81	3.99	4.48	4.73	4.99	5.25	5.77	6.03	6.55	8.25*	10.03*	
	40	4.19	4.40	4.95	5.24	5.54	5.83	6.43	6.73	7.33	9.30*	11.40*	
	60	4.81	5.08	5.75	6.10	6.46	6.82	7.56	7.93	8.69	11.18*	13.88*	
	70	5.08	5.37	6.09	6.47	6.86	7.26	8.06	8.47	9.30	12.06*	15.04*	
	80	5.33	5.64	6.41	6.83	7.25	7.67	8.54	8.98	9.89	12.89*	16.17*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 m (RADIUS = 4.2 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX
TEMPERATURE RISE

CEILING HEIGHT, m

(m*s)^{1/2}

°C

1

2

4

5

6

7

9

10

12

18

24

0

5

10

20

30

40

60

70

80

10

5

10

20

30

40

60

70

80

20

5

10

20

30

40

60

70

80

50

5

10

20

30

40

60

70

80

100

5

10

20

30

40

60

70

80

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 m (RADIUS = 4.2 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s)^{1/2}

°C

1

2

4

5

6

7

9

10

12

18

24

150

2.56 3.10 4.39 4.85 5.62 5.96 6.28 2.75 3.35 4.15 4.75 5.25 6.08 6.44 6.78 3.01 3.69 4.66 5.42 6.08 7.25 7.78 8.30 3.19 3.92 4.98 5.82 6.56 7.88 8.49 9.07 3.37 4.16 5.30 6.23 7.05 8.53 9.22 9.88 3.55 4.39 5.63 6.64 7.55 9.20 9.98 10.73 3.92 4.87 6.31 7.51 8.61 10.62 11.57 12.49 4.10 5.11 6.65 7.96 9.15 11.36 12.40 13.40 4.46 5.59 7.36 8.88 10.29 12.88 14.10 15.29 5.60* 7.15* 9.68* 11.91* 13.99* 17.82* 19.62* 21.36* 6.78* 8.80* 12.18* 15.19* 17.98* 23.11* 25.52* 27.85*

200

2.75 3.35 4.15 4.75 5.25 6.08 6.44 6.78 3.22 3.96 4.99 5.80 6.49 7.69 8.24 8.76 3.41 4.20 5.32 6.20 6.96 8.31 8.93 9.52 3.60 4.44 5.65 6.61 7.45 8.95 9.64 10.31 3.79 4.68 5.98 7.03 7.96 9.62 10.39 11.13 4.16 5.17 6.66 7.89 9.00 11.00 11.94 12.85 4.35 5.42 7.01 8.34 9.53 11.73 12.76 13.75 4.72 5.91 7.72 9.25 10.65 13.22 14.43 15.61 5.90* 7.49* 10.03* 12.25* 14.31* 18.11* 19.90* 21.64* 7.11* 9.16* 12.53* 15.51* 18.28* 23.39* 25.79* 28.11*

250

2.91 3.55 4.42 5.06 5.59 6.47 6.85 7.21 3.40 4.19 5.28 6.13 6.85 8.09 8.65 9.18 3.59 4.44 5.61 6.53 7.32 8.70 9.33 9.93 3.79 4.68 5.95 6.95 7.82 9.34 10.04 10.71 3.98 4.93 6.29 7.37 8.32 10.00 10.77 11.52 4.37 5.44 6.98 8.24 9.35 11.37 12.31 13.21 4.57 5.69 7.33 8.68 9.89 12.08 13.10 14.10 4.95 6.19 8.04 9.59 10.99 13.55 14.76 15.92 6.16* 7.80* 10.37* 12.58* 14.62* 18.40* 20.19* 21.91* 7.40* 9.49* 12.86* 15.83* 18.58* 23.66* 26.05* 28.37*

300

3.05 3.74 4.65 5.33 5.89 6.82 7.22 7.59 3.56 4.39 5.54 6.42 7.17 8.44 9.02 9.56 3.76 4.64 5.88 6.83 7.65 9.06 9.70 10.31 3.96 4.90 6.22 7.25 8.14 9.70 10.41 11.08 4.16 5.16 6.57 7.68 8.65 10.35 11.14 11.88 4.56 5.67 7.27 8.55 9.69 11.71 12.65 13.56 4.76 5.93 7.63 9.00 10.22 12.42 13.44 14.43 5.15 6.44 8.34 9.91 11.31 13.87 15.07 16.23 6.39* 8.08* 10.68* 12.90* 14.93* 18.69* 20.47* 22.18* 7.66* 9.80* 13.19* 16.14* 18.88* 23.94* 26.32* 28.62*

400

3.29 4.05 5.06 5.80 6.42 7.42 7.86 8.26 3.83 4.74 5.99 6.93 7.73 9.08 9.68 10.24 4.04 5.01 6.34 7.36 8.22 9.70 10.36 10.99 4.25 5.28 6.70 7.79 8.73 10.34 11.07 11.76 4.46 5.55 7.06 8.23 9.24 11.00 11.80 12.56 4.88 6.08 7.78 9.12 10.29 12.35 13.30 14.21 5.09 6.35 8.14 9.57 10.82 13.05 14.08 15.07 5.50 6.88 8.87 10.49 11.92 14.49 15.68 16.84 6.80* 8.58* 11.25* 13.49* 15.53* 19.26* 21.02* 22.72* 8.13* 10.35* 13.79* 16.74* 19.46* 24.48* 26.84* 29.13*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 m (RADIUS = 4.2 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s)

RESPONSE
TIME INDEX

TEMPERATURE
RISE

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
0	5	1.82	2.10	2.71	3.02	3.33	3.64	4.28	4.60	5.25	7.24*	9.30*
	10	2.31	2.76	3.67	4.12	4.58	5.04	5.98	6.46	7.42	10.40*	13.51*
	20	3.14	3.87	5.28	5.98	6.69	7.40	8.85	9.59	11.08	15.72*	20.59*
	30	3.87	4.85	6.69	7.61	8.54	9.47	11.36	12.33	14.28	20.39*	26.80*
	40	4.54	5.74	7.99	9.11	10.23	11.37	13.67	14.84	17.23	24.67*	32.51*
	60	5.76	7.38	10.37	11.85	13.34	14.84	17.90	19.45	22.62	32.51*	42.95*
	70	6.34	8.14	11.48	13.13	14.79	16.47	19.87	21.61	25.14	36.18*	47.84*
	80	6.89	8.88	12.55	14.36	16.19	18.03	21.78	23.69	27.57	39.71*	52.55*
10	5	2.23	2.43	2.94	3.23	3.52	3.82	4.43	4.74	5.38	7.35*	9.40*
	10	2.72	3.06	3.87	4.30	4.74	5.19	6.11	6.58	7.53	10.50*	13.60*
	20	3.51	4.12	5.45	6.13	6.83	7.53	8.96	9.69	11.17	15.80*	20.67*
	30	4.21	5.07	6.85	7.75	8.66	9.58	11.46	12.42	14.37	20.46*	26.87*
	40	4.85	5.95	8.14	9.24	10.35	11.47	13.76	14.93	17.30	24.74*	32.57*
	60	6.05	7.57	10.50	11.96	13.44	14.94	17.98	19.53	22.69	32.57*	43.01*
	70	6.61	8.33	11.60	13.24	14.89	16.56	19.95	21.68	25.20	36.24*	47.89*
	80	7.16	9.06	12.67	14.47	16.29	18.12	21.86	23.76	27.63	39.77*	52.60*
20	5	2.48	2.66	3.15	3.42	3.70	3.99	4.58	4.89	5.51	7.46*	9.50*
	10	3.01	3.31	4.07	4.48	4.90	5.34	6.24	6.70	7.64	10.59*	13.68*
	20	3.83	4.37	5.62	6.28	6.96	7.65	9.07	9.79	11.26	15.88*	20.74*
	30	4.52	5.30	7.00	7.88	8.78	9.70	11.56	12.51	14.45	20.53*	26.94*
	40	5.15	6.16	8.28	9.36	10.46	11.58	13.86	15.02	17.38	24.80*	32.63*
	60	6.33	7.76	10.63	12.08	13.55	15.03	18.06	19.61	22.76	32.63*	43.07*
	70	6.88	8.51	11.73	13.35	14.99	16.65	20.03	21.76	25.27	36.29*	47.94*
	80	7.42	9.24	12.79	14.58	16.38	18.21	21.94	23.83	27.70	39.83*	52.65*
50	5	2.95	3.13	3.62	3.88	4.15	4.43	4.99	5.28	5.88	7.79*	9.81*
	10	3.59	3.87	4.57	4.95	5.35	5.76	6.62	7.06	7.97	10.87*	13.94*
	20	4.52	4.98	6.11	6.72	7.36	8.02	9.39	10.10	11.54	16.12*	20.96*
	30	5.26	5.91	7.45	8.29	9.15	10.03	11.85	12.79	14.70	20.74*	27.14*
	40	5.92	6.76	8.70	9.74	10.80	11.89	14.13	15.27	17.62	25.00*	32.82*
	60	7.10	8.32	11.02	12.42	13.86	15.32	18.31	19.84	22.97	32.81*	43.23*
	70	7.64	9.06	12.10	13.68	15.29	16.92	20.27	21.98	25.48	36.47*	48.10*
	80	8.16	9.77	13.16	14.90	16.67	18.48	22.17	24.05	27.90	39.99*	52.81*
100	5	3.44	3.63	4.14	4.41	4.69	4.97	5.54	5.83	6.41	8.30*	10.31*
	10	4.22	4.49	5.19	5.57	5.96	6.36	7.19	7.61	8.48	11.32*	14.37*
	20	5.30	5.73	6.80	7.38	7.98	8.61	9.92	10.59	11.99	16.51*	21.32*
	30	6.14	6.73	8.15	8.93	9.74	10.58	12.34	13.24	15.11	21.10*	27.47*
	40	6.86	7.60	9.38	10.35	11.36	12.41	14.58	15.70	18.00	25.33*	33.12*
	60	8.11	9.17	11.65	12.99	14.37	15.79	18.72	20.23	23.32	33.11*	43.51*
	70	8.67	9.90	12.72	14.23	15.78	17.38	20.67	22.36	25.81	36.75*	48.37*
	80	9.21	10.60	13.75	15.43	17.15	18.92	22.55	24.41	28.22	40.27*	53.07*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 m (RADIUS = 4.2 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	3.80	3.99	4.52	4.80	5.09	5.38	5.97	6.26	6.85	8.76*	10.77*
	10	4.67	4.95	5.67	6.06	6.45	6.85	7.68	8.10	8.96	11.77*	14.79*
	20	5.88	6.30	7.36	7.94	8.53	9.14	10.41	11.07	12.44	16.89*	21.69*
	30	6.80	7.36	8.75	9.50	10.29	11.10	12.81	13.69	15.52	21.45*	27.79*
	40	7.58	8.29	9.99	10.93	11.90	12.91	15.03	16.12	18.38	25.66*	33.43*
	60	8.91	9.90	12.25	13.53	14.87	16.25	19.13	20.62	23.67	33.41*	43.79*
	70	9.50	10.64	13.31	14.76	16.27	17.83	21.06	22.73	26.15	37.04*	48.64*
	80	10.07	11.35	14.33	15.95	17.63	19.35	22.93	24.77	28.55	40.55*	53.32*
200	5	4.09	4.29	4.84	5.13	5.43	5.73	6.33	6.63	7.23	9.17*	11.20*
	10	5.04	5.33	6.07	6.46	6.86	7.27	8.10	8.52	9.38	12.19*	15.21*
	20	6.35	6.78	7.85	8.42	9.01	9.62	10.87	11.52	12.86	17.27*	22.05*
	30	7.34	7.90	9.28	10.02	10.79	11.59	13.26	14.13	15.93	21.80*	28.12*
	40	8.17	8.86	10.54	11.46	12.41	13.39	15.46	16.54	18.76	25.99*	33.74*
	60	9.58	10.54	12.82	14.06	15.36	16.71	19.53	21.00	24.01	33.71*	44.07*
	70	10.20	11.30	13.87	15.28	16.75	18.27	21.45	23.10	26.48	37.33*	48.91*
	80	10.79	12.02	14.89	16.46	18.09	19.79	23.31	25.13	28.87	40.83*	53.58*
250	5	4.33	4.54	5.11	5.41	5.72	6.02	6.64	6.95	7.56	9.53*	11.59*
	10	5.36	5.65	6.41	6.81	7.22	7.64	8.48	8.91	9.77	12.58*	15.61*
	20	6.75	7.19	8.27	8.85	9.44	10.05	11.30	11.94	13.27	17.65*	22.40*
	30	7.80	8.37	9.75	10.49	11.26	12.05	13.69	14.55	16.32	22.14*	28.45*
	40	8.68	9.37	11.04	11.94	12.88	13.85	15.89	16.95	19.14	26.31*	34.04*
	60	10.16	11.10	13.34	14.56	15.83	17.16	19.93	21.38	24.36	34.00*	44.34*
	70	10.81	11.88	14.40	15.78	17.22	18.71	21.84	23.46	26.82	37.61*	49.17*
	80	11.43	12.62	15.42	16.95	18.55	20.21	23.68	25.49	29.19	41.10*	53.84*
300	5	4.55	4.76	5.35	5.66	5.98	6.29	6.92	7.23	7.86	9.86*	11.96*
	10	5.64	5.94	6.72	7.13	7.55	7.97	8.82	9.25	10.12	12.96*	15.99*
	20	7.11	7.55	8.65	9.23	9.83	10.44	11.70	12.34	13.66	18.02*	22.76*
	30	8.22	8.78	10.17	10.92	11.68	12.47	14.11	14.95	16.70	22.49*	28.77*
	40	9.14	9.83	11.50	12.40	13.33	14.29	16.30	17.34	19.51	26.64*	34.35*
	60	10.68	11.61	13.83	15.03	16.29	17.59	20.33	21.75	24.70	34.30*	44.62*
	70	11.36	12.41	14.90	16.25	17.67	19.14	22.22	23.83	27.15	37.90*	49.44*
	80	12.00	13.16	15.92	17.42	19.00	20.63	24.06	25.84	29.52	41.38*	54.10*
400	5	4.93	5.15	5.77	6.09	6.42	6.75	7.41	7.73	8.38	10.46*	12.61*
	10	6.13	6.43	7.25	7.68	8.11	8.55	9.43	9.87	10.76	13.64*	16.71*
	20	7.74	8.19	9.32	9.92	10.53	11.15	12.41	13.06	14.37	18.72*	23.45*
	30	8.94	9.51	10.92	11.68	12.45	13.24	14.87	15.71	17.43	23.16*	29.42*
	40	9.93	10.62	12.31	13.21	14.14	15.09	17.07	18.10	20.23	27.28*	34.95*
	60	11.59	12.51	14.71	15.90	17.14	18.41	21.09	22.49	25.38	34.88*	45.17*
	70	12.32	13.35	15.81	17.13	18.52	19.96	22.97	24.54	27.80	38.47*	49.97*
	80	12.99	14.14	16.85	18.32	19.85	21.44	24.79	26.54	30.15	41.93*	54.61*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.5 m (RADIUS = 4.6 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	5	0.60	0.65	0.78	0.84	0.91	0.98	1.12	1.19	1.33	1.74*	2.16*	
	10	0.67	0.74	0.90	0.99	1.08	1.16	1.34	1.43	1.61	2.15*	2.70*	
	20	0.78	0.89	1.11	1.23	1.35	1.47	1.71	1.83	2.08	2.83*	3.60*	
	30	0.88	1.02	1.30	1.45	1.59	1.74	2.04	2.19	2.49	3.43*	4.39*	
	40	0.97	1.13	1.47	1.64	1.81	1.99	2.34	2.51	2.87	3.97*	5.12*	
	60	1.13	1.35	1.78	2.00	2.22	2.44	2.88	3.11	3.56	4.98*	6.45*	
	70	1.21	1.45	1.93	2.17	2.41	2.65	3.14	3.39	3.89	5.45*	7.07*	
	80	1.29	1.55	2.07	2.33	2.59	2.85	3.39	3.66	4.20	5.90*	7.67*	
10	5	0.80	0.83	0.94	1.00	1.06	1.13	1.25	1.32	1.45	1.85*	2.26*	
	10	0.89	0.93	1.07	1.15	1.22	1.30	1.47	1.55	1.72	2.24*	2.78*	
	20	1.03	1.09	1.28	1.38	1.49	1.60	1.82	1.94	2.17	2.91*	3.67*	
	30	1.13	1.22	1.45	1.58	1.72	1.85	2.14	2.28	2.58	3.50*	4.46*	
	40	1.23	1.33	1.62	1.77	1.93	2.09	2.43	2.60	2.95	4.04*	5.18*	
	60	1.39	1.54	1.92	2.12	2.33	2.54	2.97	3.19	3.64	5.04*	6.50*	
	70	1.46	1.64	2.06	2.28	2.51	2.74	3.22	3.46	3.96	5.50*	7.12*	
	80	1.53	1.73	2.20	2.44	2.69	2.95	3.47	3.73	4.27	5.95*	7.72*	
20	5	0.87	0.90	1.02	1.08	1.15	1.21	1.35	1.41	1.54	1.94*	2.36*	
	10	0.99	1.03	1.17	1.25	1.33	1.41	1.57	1.65	1.82	2.33*	2.87*	
	20	1.15	1.21	1.40	1.50	1.60	1.71	1.92	2.04	2.26	2.98*	3.75*	
	30	1.28	1.36	1.58	1.70	1.83	1.96	2.23	2.37	2.66	3.57*	4.52*	
	40	1.38	1.48	1.74	1.89	2.04	2.20	2.52	2.69	3.03	4.11*	5.24*	
	60	1.56	1.70	2.04	2.23	2.43	2.63	3.05	3.27	3.71	5.10*	6.56*	
	70	1.64	1.79	2.18	2.39	2.61	2.84	3.30	3.54	4.03	5.56*	7.18*	
	80	1.72	1.89	2.32	2.55	2.79	3.03	3.54	3.80	4.34	6.01*	7.77*	
50	5	1.01	1.05	1.17	1.24	1.31	1.38	1.52	1.59	1.73	2.15*	2.58*	
	10	1.17	1.22	1.37	1.45	1.53	1.61	1.78	1.87	2.03	2.55*	3.10*	
	20	1.39	1.45	1.64	1.74	1.85	1.95	2.17	2.28	2.50	3.20*	3.96*	
	30	1.54	1.62	1.85	1.97	2.10	2.22	2.49	2.62	2.90	3.77*	4.72*	
	40	1.68	1.77	2.03	2.17	2.32	2.47	2.77	2.93	3.26	4.30*	5.42*	
	60	1.90	2.02	2.35	2.52	2.71	2.90	3.29	3.50	3.92	5.27*	6.72*	
	70	1.99	2.13	2.49	2.68	2.89	3.10	3.54	3.76	4.23	5.73*	7.34*	
	80	2.08	2.23	2.63	2.84	3.06	3.29	3.77	4.02	4.53	6.18*	7.93*	
100	5	1.16	1.20	1.33	1.41	1.48	1.56	1.71	1.78	1.93	2.38*	2.83*	
	10	1.36	1.41	1.57	1.66	1.75	1.84	2.02	2.11	2.28	2.83*	3.40*	
	20	1.63	1.69	1.90	2.01	2.12	2.23	2.46	2.57	2.80	3.51*	4.27*	
	30	1.82	1.90	2.14	2.27	2.40	2.53	2.80	2.94	3.21	4.08*	5.03*	
	40	1.98	2.08	2.35	2.50	2.65	2.80	3.11	3.26	3.58	4.61*	5.72*	
	60	2.25	2.37	2.70	2.88	3.07	3.25	3.64	3.84	4.24	5.56*	7.00*	
	70	2.37	2.50	2.86	3.06	3.26	3.46	3.89	4.10	4.55	6.01*	7.60*	
	80	2.47	2.62	3.01	3.22	3.44	3.66	4.12	4.36	4.85	6.45*	8.18*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.5 m (RADIUS = 4.6 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 <													

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.5 m (RADIUS = 4.6 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	°C	CEILING HEIGHT, m										
			1	2	4	5	6	7	9	10	12	18	24
0	(m*s) ^{1/2}	5	0.86	0.95	1.15	1.26	1.37	1.48	1.70	1.81	2.03	2.70*	3.39*
		10	1.00	1.12	1.40	1.55	1.69	1.84	2.14	2.29	2.59	3.51*	4.46*
		20	1.22	1.42	1.83	2.03	2.24	2.45	2.88	3.10	3.53	4.87*	6.26*
		30	1.42	1.68	2.20	2.46	2.73	2.99	3.53	3.81	4.36	6.07*	7.85*
		40	1.59	1.91	2.54	2.85	3.17	3.49	4.13	4.46	5.12	7.16*	9.30*
		60	1.92	2.35	3.17	3.57	3.98	4.39	5.23	5.65	6.51	9.17*	11.96*
		70	2.08	2.55	3.46	3.91	4.36	4.82	5.74	6.21	7.16	10.11*	13.20*
		80	2.22	2.75	3.74	4.23	4.73	5.22	6.23	6.74	7.78	11.01*	14.40*
10		5	1.13	1.18	1.35	1.44	1.54	1.64	1.85	1.95	2.16	2.81*	3.49*
		10	1.29	1.37	1.60	1.72	1.85	1.99	2.27	2.41	2.70	3.61*	4.55*
		20	1.53	1.65	2.00	2.19	2.38	2.58	2.99	3.20	3.63	4.95*	6.34*
		30	1.72	1.90	2.36	2.60	2.85	3.11	3.63	3.90	4.44	6.14*	7.91*
		40	1.89	2.13	2.69	2.98	3.29	3.60	4.22	4.55	5.20	7.23*	9.36*
		60	2.20	2.55	3.30	3.69	4.09	4.49	5.31	5.73	6.58	9.23*	12.02*
		70	2.35	2.74	3.59	4.02	4.46	4.91	5.82	6.28	7.23	10.17*	13.26*
		80	2.49	2.93	3.87	4.34	4.83	5.32	6.31	6.82	7.85	11.07*	14.46*
20		5	1.24	1.30	1.47	1.57	1.67	1.77	1.97	2.07	2.28	2.92*	3.59*
		10	1.44	1.51	1.74	1.86	1.99	2.12	2.39	2.53	2.81	3.70*	4.63*
		20	1.71	1.83	2.15	2.33	2.51	2.71	3.10	3.30	3.72	5.03*	6.41*
		30	1.92	2.08	2.50	2.74	2.98	3.22	3.73	3.99	4.53	6.21*	7.98*
		40	2.11	2.31	2.83	3.11	3.40	3.70	4.32	4.63	5.28	7.30*	9.42*
		60	2.43	2.73	3.43	3.81	4.19	4.59	5.40	5.81	6.65	9.29*	12.07*
		70	2.58	2.92	3.71	4.13	4.56	5.00	5.90	6.36	7.29	10.22*	13.31*
		80	2.72	3.11	3.99	4.45	4.92	5.41	6.39	6.89	7.92	11.13*	14.51*
50		5	1.46	1.52	1.70	1.80	1.91	2.01	2.22	2.33	2.54	3.19*	3.86*
		10	1.71	1.79	2.02	2.15	2.28	2.41	2.68	2.82	3.09	3.96*	4.88*
		20	2.06	2.17	2.49	2.66	2.84	3.02	3.40	3.59	3.99	5.26*	6.63*
		30	2.32	2.47	2.87	3.08	3.31	3.54	4.02	4.27	4.78	6.42*	8.18*
		40	2.54	2.72	3.20	3.46	3.73	4.01	4.59	4.89	5.51	7.49*	9.61*
		60	2.92	3.17	3.80	4.14	4.50	4.87	5.65	6.05	6.86	9.47*	12.24*
		70	3.08	3.37	4.07	4.46	4.86	5.28	6.14	6.59	7.50	10.40*	13.47*
		80	3.24	3.56	4.34	4.77	5.21	5.67	6.62	7.11	8.12	11.29*	14.66*
100		5	1.68	1.74	1.94	2.06	2.17	2.28	2.50	2.61	2.84	3.51*	4.22*
		10	2.00	2.08	2.33	2.47	2.61	2.74	3.02	3.17	3.45	4.33*	5.26*
		20	2.42	2.54	2.87	3.05	3.23	3.42	3.80	3.99	4.38	5.63*	6.98*
		30	2.74	2.89	3.29	3.51	3.74	3.96	4.43	4.67	5.17	6.76*	8.50*
		40	3.01	3.19	3.66	3.91	4.18	4.45	5.00	5.29	5.89	7.82*	9.91*
		60	3.45	3.68	4.29	4.62	4.96	5.31	6.05	6.43	7.21	9.76*	12.51*
		70	3.64	3.91	4.57	4.94	5.32	5.71	6.53	6.96	7.84	10.68*	13.74*
		80	3.82	4.11	4.85	5.25	5.67	6.10	7.01	7.48	8.45	11.57*	14.92*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.5 m (RADIUS = 4.6 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s)^{1/2}

	1	2	4	5	6	7	9	10	12	18	24
150	1.84	1.91	2.12	2.24	2.35	2.47	2.71	2.82	3.06	3.76*	4.50*
	2.21	2.29	2.56	2.70	2.84	2.99	3.28	3.43	3.72	4.62*	5.58*
	2.69	2.81	3.16	3.34	3.53	3.72	4.11	4.30	4.70	5.95*	7.31*
	3.05	3.20	3.62	3.84	4.07	4.30	4.77	5.01	5.51	7.09*	8.82*
	3.35	3.53	4.01	4.27	4.53	4.80	5.36	5.65	6.23	8.13*	10.21*
	3.84	4.07	4.68	5.01	5.34	5.69	6.41	6.78	7.55	10.05*	12.79*
	4.05	4.31	4.98	5.34	5.71	6.10	6.90	7.31	8.17	10.96*	14.00*
	4.25	4.54	5.26	5.66	6.07	6.49	7.37	7.82	8.77	11.84*	15.18*
200	1.97	2.04	2.26	2.38	2.51	2.63	2.87	3.00	3.24	3.97*	4.73*
	2.37	2.46	2.74	2.89	3.04	3.19	3.49	3.64	3.94	4.88*	5.86*
	2.91	3.03	3.39	3.58	3.78	3.98	4.37	4.57	4.97	6.24*	7.61*
	3.30	3.45	3.88	4.11	4.35	4.58	5.07	5.31	5.80	7.39*	9.12*
	3.62	3.81	4.30	4.56	4.84	5.11	5.67	5.96	6.54	8.43*	10.50*
	4.15	4.39	5.01	5.34	5.68	6.02	6.74	7.11	7.87	10.34*	13.06*
	4.39	4.65	5.32	5.68	6.06	6.44	7.23	7.64	8.48	11.24*	14.26*
	4.60	4.89	5.62	6.01	6.42	6.83	7.70	8.15	9.08	12.11*	15.43*
250	2.08	2.15	2.39	2.51	2.64	2.77	3.02	3.14	3.39	4.15*	4.94*
	2.51	2.61	2.90	3.05	3.21	3.36	3.68	3.83	4.14	5.10*	6.11*
	3.09	3.22	3.59	3.79	3.99	4.19	4.60	4.80	5.21	6.50*	7.89*
	3.51	3.67	4.11	4.35	4.59	4.83	5.32	5.57	6.07	7.66*	9.40*
	3.86	4.05	4.55	4.82	5.10	5.38	5.95	6.24	6.82	8.71*	10.78*
	4.43	4.67	5.29	5.63	5.97	6.32	7.04	7.41	8.16	10.62*	13.33*
	4.67	4.94	5.62	5.99	6.36	6.75	7.54	7.94	8.78	11.51*	14.52*
	4.90	5.19	5.93	6.33	6.73	7.15	8.01	8.46	9.37	12.38*	15.68*
300	2.18	2.25	2.49	2.62	2.75	2.89	3.15	3.27	3.53	4.31*	5.12*
	2.64	2.74	3.03	3.19	3.36	3.52	3.84	4.00	4.31	5.29*	6.33*
	3.25	3.39	3.77	3.97	4.18	4.39	4.80	5.01	5.43	6.74*	8.15*
	3.70	3.86	4.32	4.56	4.81	5.05	5.55	5.80	6.31	7.92*	9.68*
	4.07	4.26	4.78	5.05	5.34	5.62	6.20	6.49	7.08	8.98*	11.06*
	4.67	4.91	5.55	5.89	6.24	6.59	7.31	7.68	8.43	10.88*	13.59*
	4.93	5.20	5.89	6.26	6.64	7.03	7.82	8.23	9.06	11.78*	14.78*
	5.17	5.46	6.21	6.61	7.02	7.44	8.30	8.74	9.65	12.64*	15.93*
400	2.35	2.43	2.68	2.82	2.95	3.09	3.37	3.50	3.77	4.58*	5.43*
	2.86	2.96	3.27	3.44	3.61	3.78	4.12	4.29	4.62	5.64*	6.72*
	3.53	3.67	4.08	4.29	4.51	4.73	5.16	5.38	5.81	7.17*	8.62*
	4.03	4.20	4.67	4.93	5.18	5.44	5.96	6.22	6.74	8.39*	10.18*
	4.43	4.63	5.17	5.46	5.75	6.04	6.64	6.94	7.54	9.46*	11.57*
	5.09	5.34	6.00	6.35	6.71	7.07	7.80	8.18	8.94	11.39*	14.10*
	5.37	5.65	6.36	6.74	7.13	7.52	8.33	8.74	9.57	12.28*	15.28*
	5.63	5.93	6.70	7.11	7.53	7.95	8.82	9.27	10.17	13.14*	16.43*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.5 m (RADIUS = 4.6 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
0	5	1.27	1.42	1.77	1.95	2.13	2.31	2.68	2.87	3.24	4.38*	5.54*	
	10	1.54	1.77	2.27	2.53	2.78	3.04	3.56	3.83	4.36	5.99*	7.69*	
	20	1.98	2.37	3.12	3.50	3.88	4.27	5.05	5.44	6.24	8.72*	11.30*	
	30	2.37	2.88	3.87	4.36	4.85	5.35	6.35	6.86	7.90	11.10*	14.46*	
	40	2.73	3.36	4.55	5.14	5.74	6.33	7.55	8.16	9.41	13.30*	17.37*	
	60	3.39	4.23	5.80	6.58	7.36	8.15	9.74	10.55	12.19	17.31*	22.69*	
	70	3.70	4.64	6.39	7.25	8.12	8.99	10.76	11.66	13.49	19.18*	25.18*	
	80	3.99	5.03	6.95	7.90	8.85	9.81	11.75	12.74	14.74	20.99*	27.57*	
10	5	1.62	1.71	2.00	2.16	2.32	2.49	2.84	3.01	3.37	4.49*	5.64*	
	10	1.90	2.06	2.48	2.71	2.95	3.19	3.70	3.95	4.47	6.09*	7.77*	
	20	2.34	2.62	3.30	3.66	4.02	4.40	5.16	5.55	6.34	8.80*	11.37*	
	30	2.71	3.12	4.03	4.50	4.98	5.46	6.45	6.96	7.98	11.17*	14.53*	
	40	3.05	3.58	4.70	5.27	5.85	6.44	7.64	8.25	9.49	13.36*	17.43*	
	60	3.68	4.43	5.94	6.70	7.47	8.24	9.82	10.63	12.26	17.37*	22.74*	
	70	3.98	4.83	6.52	7.37	8.22	9.09	10.85	11.74	13.56	19.24*	25.23*	
	80	4.26	5.22	7.08	8.01	8.95	9.90	11.83	12.81	14.81	21.05*	27.63*	
20	5	1.80	1.89	2.17	2.32	2.48	2.65	2.98	3.15	3.50	4.60*	5.75*	
	10	2.12	2.26	2.66	2.88	3.11	3.34	3.82	4.07	4.58	6.18*	7.86*	
	20	2.59	2.84	3.47	3.81	4.16	4.52	5.27	5.65	6.43	8.87*	11.44*	
	30	2.98	3.33	4.18	4.64	5.10	5.58	6.55	7.05	8.07	11.25*	14.59*	
	40	3.33	3.79	4.85	5.40	5.97	6.55	7.74	8.34	9.57	13.43*	17.49*	
	60	3.95	4.62	6.07	6.82	7.57	8.34	9.91	10.71	12.34	17.43*	22.80*	
	70	4.24	5.02	6.65	7.48	8.32	9.18	10.93	11.82	13.63	19.30*	25.28*	
	80	4.53	5.40	7.20	8.12	9.05	9.99	11.91	12.89	14.88	21.11*	27.68*	
50	5	2.12	2.22	2.51	2.67	2.83	2.99	3.33	3.50	3.84	4.91*	6.05*	
	10	2.54	2.67	3.06	3.28	3.50	3.72	4.18	4.42	4.90	6.46*	8.12*	
	20	3.11	3.33	3.91	4.22	4.55	4.89	5.60	5.96	6.71	9.11*	11.66*	
	30	3.56	3.86	4.62	5.03	5.47	5.92	6.85	7.33	8.32	11.46*	14.79*	
	40	3.94	4.32	5.27	5.78	6.32	6.87	8.01	8.60	9.81	13.63*	17.67*	
	60	4.61	5.16	6.46	7.16	7.89	8.63	10.16	10.95	12.55	17.61*	22.97*	
	70	4.91	5.54	7.02	7.81	8.63	9.46	11.17	12.05	13.84	19.47*	25.44*	
	80	5.20	5.92	7.57	8.44	9.34	10.26	12.15	13.11	15.08	21.27*	27.83*	
100	5	2.46	2.56	2.87	3.04	3.21	3.39	3.73	3.91	4.26	5.34*	6.49*	
	10	2.97	3.11	3.52	3.74	3.96	4.19	4.65	4.89	5.36	6.89*	8.54*	
	20	3.66	3.88	4.45	4.76	5.08	5.41	6.09	6.44	7.16	9.49*	12.02*	
	30	4.19	4.47	5.20	5.60	6.01	6.44	7.33	7.79	8.74	11.81*	15.12*	
	40	4.63	4.98	5.87	6.35	6.85	7.38	8.47	9.03	10.20	13.95*	17.98*	
	60	5.38	5.87	7.06	7.72	8.40	9.10	10.58	11.34	12.91	17.91*	23.24*	
	70	5.71	6.27	7.62	8.36	9.12	9.92	11.57	12.43	14.18	19.76*	25.71*	
	80	6.02	6.65	8.15	8.97	9.83	10.71	12.53	13.48	15.41	21.55*	28.09*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.5 m (RADIUS = 4.6 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117-kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	TEMPERATURE RISE °C	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150	5	2.71	2.81	3.14	3.32	3.50	3.68	4.04	4.22	4.58	5.70*	6.88*	
	10	3.29	3.43	3.86	4.08	4.32	4.55	5.02	5.26	5.75	7.28*	8.93*	
	20	4.07	4.28	4.87	5.18	5.51	5.84	6.51	6.86	7.57	9.87*	12.38*	
	30	4.65	4.93	5.67	6.06	6.47	6.89	7.76	8.21	9.14	12.16*	15.44*	
	40	5.14	5.48	6.36	6.84	7.33	7.84	8.90	9.45	10.58	14.28*	18.28*	
	60	5.96	6.43	7.59	8.22	8.87	9.56	10.98	11.73	13.26	18.20*	23.52*	
	70	6.32	6.85	8.15	8.86	9.60	10.36	11.97	12.80	14.52	20.05*	25.98*	
	80	6.65	7.25	8.69	9.47	10.29	11.14	12.92	13.84	15.74	21.83*	28.35*	
200	5	2.91	3.02	3.36	3.54	3.73	3.92	4.29	4.48	4.85	6.00*	7.21*	
	10	3.54	3.69	4.13	4.37	4.61	4.85	5.34	5.58	6.07	7.62*	9.29*	
	20	4.39	4.62	5.21	5.54	5.87	6.20	6.88	7.23	7.93	10.22*	12.72*	
	30	5.03	5.31	6.06	6.46	6.87	7.29	8.15	8.60	9.51	12.49*	15.77*	
	40	5.56	5.90	6.78	7.26	7.75	8.25	9.30	9.84	10.95	14.60*	18.59*	
	60	6.44	6.90	8.05	8.67	9.31	9.98	11.38	12.10	13.61	18.50*	23.80*	
	70	6.82	7.34	8.62	9.31	10.04	10.78	12.35	13.17	14.86	20.33*	26.24*	
	80	7.18	7.76	9.17	9.93	10.73	11.56	13.30	14.20	16.07	22.10*	28.61*	
250	5	3.08	3.19	3.55	3.74	3.93	4.12	4.51	4.70	5.08	6.26*	7.50*	
	10	3.76	3.92	4.37	4.61	4.86	5.11	5.61	5.86	6.36	7.93*	9.62*	
	20	4.68	4.90	5.52	5.84	6.18	6.52	7.21	7.56	8.27	10.56*	13.06*	
	30	5.35	5.64	6.40	6.80	7.22	7.64	8.51	8.95	9.86	12.82*	16.08*	
	40	5.92	6.26	7.15	7.63	8.12	8.63	9.66	10.20	11.30	14.92*	18.89*	
	60	6.85	7.31	8.46	9.07	9.71	10.37	11.75	12.47	13.95	18.79*	24.07*	
	70	7.26	7.77	9.04	9.73	10.44	11.18	12.72	13.53	15.19	20.61*	26.51*	
	80	7.63	8.21	9.60	10.36	11.14	11.96	13.66	14.55	16.39	22.38*	28.87*	
300	5	3.23	3.35	3.71	3.91	4.11	4.30	4.70	4.90	5.29	6.49*	7.76*	
	10	3.95	4.12	4.58	4.83	5.09	5.34	5.85	6.10	6.61	8.22*	9.93*	
	20	4.92	5.15	5.78	6.12	6.46	6.81	7.51	7.86	8.58	10.87*	13.39*	
	30	5.64	5.93	6.70	7.11	7.53	7.96	8.83	9.28	10.19	13.14*	16.40*	
	40	6.23	6.59	7.49	7.97	8.46	8.97	10.01	10.54	11.64	15.23*	19.19*	
	60	7.22	7.68	8.83	9.45	10.08	10.74	12.11	12.82	14.28	19.08*	24.34*	
	70	7.64	8.16	9.43	10.11	10.82	11.55	13.08	13.87	15.51	20.89*	26.77*	
	80	8.04	8.61	10.00	10.75	11.53	12.33	14.02	14.90	16.71	22.65*	29.12*	
400	5	3.49	3.61	4.00	4.20	4.41	4.62	5.04	5.24	5.65	6.91*	8.23*	
	10	4.29	4.46	4.95	5.21	5.48	5.74	6.27	6.54	7.07	8.72*	10.49*	
	20	5.35	5.59	6.25	6.60	6.95	7.31	8.03	8.39	9.12	11.45*	13.99*	
	30	6.14	6.44	7.24	7.66	8.09	8.53	9.42	9.87	10.78	13.74*	17.00*	
	40	6.79	7.14	8.07	8.56	9.07	9.58	10.63	11.16	12.26	15.82*	19.77*	
	60	7.85	8.32	9.48	10.11	10.75	11.41	12.77	13.47	14.91	19.65*	24.89*	
	70	8.31	8.83	10.11	10.80	11.51	12.24	13.75	14.53	16.14	21.45*	27.30*	
	80	8.74	9.31	10.70	11.46	12.23	13.03	14.69	15.55	17.33	23.19*	29.63*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.5 m (RADIUS = 4.6 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	°C												
	5	1.94	2.23	2.84	3.15	3.46	3.78	4.42	4.74	5.39	7.39*	9.45*	
	10	2.47	2.93	3.85	4.31	4.77	5.24	6.18	6.66	7.63	10.63*	13.74*	
	20	3.37	4.11	5.55	6.26	6.97	7.70	9.16	9.90	11.40	16.07*	20.96*	
	30	4.15	5.15	7.03	7.97	8.90	9.85	11.76	12.73	14.71	20.84*	27.29*	
	40	4.86	6.10	8.40	9.54	10.68	11.83	14.16	15.34	17.74	25.23*	33.10*	
	60	6.18	7.85	10.91	12.41	13.92	15.45	18.54	20.11	23.30	33.26*	43.75*	
	80	6.79	8.66	12.08	13.75	15.44	17.14	20.59	22.34	25.89	37.01*	48.72*	
10	5	2.38	2.56	3.08	3.37	3.66	3.96	4.57	4.89	5.53	7.50*	9.56*	
	10	2.89	3.23	4.06	4.49	4.94	5.39	6.32	6.79	7.75	10.72*	13.83*	
	20	3.74	4.37	5.72	6.41	7.11	7.82	9.27	10.00	11.50	16.15*	21.04*	
	30	4.49	5.39	7.19	8.11	9.03	9.96	11.86	12.83	14.79	20.92*	27.36*	
	40	5.19	6.32	8.55	9.67	10.80	11.93	14.25	15.43	17.82	25.29*	33.17*	
	60	6.47	8.05	11.04	12.53	14.03	15.54	18.62	20.19	23.37	33.32*	43.80*	
	70	7.08	8.85	12.20	13.87	15.54	17.23	20.67	22.41	25.96	37.07*	48.78*	
	80	7.66	9.63	13.33	15.16	17.00	18.86	22.64	24.56	28.47	40.68*	53.57*	
20	5	2.64	2.81	3.30	3.57	3.85	4.13	4.73	5.03	5.66	7.61*	9.66*	
	10	3.20	3.50	4.26	4.67	5.10	5.54	6.45	6.91	7.86	10.81*	13.92*	
	20	4.07	4.62	5.90	6.57	7.25	7.95	9.38	10.11	11.59	16.23*	21.11*	
	30	4.81	5.62	7.35	8.25	9.16	10.08	11.96	12.92	14.88	20.99*	27.42*	
	40	5.50	6.54	8.70	9.80	10.91	12.04	14.34	15.52	17.90	25.36*	33.23*	
	60	6.76	8.24	11.17	12.65	14.14	15.64	18.71	20.27	23.44	33.38*	43.86*	
	70	7.35	9.04	12.33	13.98	15.65	17.33	20.75	22.49	26.03	37.12*	48.83*	
	80	7.93	9.82	13.45	15.27	17.10	18.95	22.72	24.64	28.53	40.74*	53.63*	
50	5	3.13	3.30	3.78	4.04	4.31	4.58	5.15	5.44	6.04	7.94*	9.97*	
	10	3.81	4.08	4.78	5.16	5.56	5.98	6.83	7.28	8.19	11.09*	14.18*	
	20	4.80	5.26	6.40	7.02	7.66	8.33	9.71	10.42	11.87	16.47*	21.33*	
	30	5.59	6.25	7.82	8.66	9.53	10.43	12.27	13.21	15.13	21.20*	27.62*	
	40	6.29	7.16	9.14	10.19	11.26	12.36	14.62	15.78	18.14	25.56*	33.41*	
	60	7.55	8.82	11.57	13.00	14.46	15.93	18.96	20.51	23.66	33.56*	44.03*	
	70	8.14	9.60	12.72	14.32	15.95	17.61	20.99	22.72	26.24	37.30*	48.99*	
	80	8.70	10.36	13.83	15.60	17.40	19.23	22.96	24.86	28.74	40.91*	53.78*	
100	5	3.65	3.82	4.32	4.59	4.86	5.14	5.71	6.00	6.59	8.45*	10.46*	
	10	4.47	4.73	5.43	5.80	6.19	6.59	7.42	7.85	8.72	11.55*	14.61*	
	20	5.62	6.04	7.11	7.70	8.30	8.93	10.25	10.93	12.34	16.86*	21.69*	
	30	6.51	7.10	8.53	9.32	10.14	10.99	12.76	13.68	15.56	21.55*	27.95*	
	40	7.28	8.03	9.83	10.81	11.84	12.89	15.09	16.22	18.53	25.89*	33.72*	
	60	8.61	9.70	12.22	13.58	14.98	16.42	19.38	20.90	24.02	33.85*	44.31*	
	70	9.21	10.47	13.35	14.88	16.46	18.07	21.40	23.10	26.59	37.58*	49.26*	
	80	9.79	11.22	14.44	16.14	17.89	19.68	23.35	25.23	29.07	41.19*	54.04*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.5 m (RADIUS = 4.6 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TEMPERATURE
 TIME INDEX RISE

CEILING HEIGHT, m

(m*s)^{1/2}

	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	4.02	4.20	4.72	5.00	5.28	5.57	6.15	6.45	7.04	8.91*	10.93*
	10	4.95	5.21	5.92	6.31	6.70	7.10	7.92	8.35	9.21	11.99*	15.03*
	20	6.23	6.64	7.70	8.27	8.87	9.48	10.76	11.42	12.79	17.24*	22.06*
	30	7.20	7.76	9.16	9.92	10.71	11.53	13.24	14.14	15.98	21.91*	28.28*
	40	8.03	8.74	10.46	11.41	12.39	13.41	15.54	16.65	18.93	26.22*	34.03*
	60	9.45	10.46	12.84	14.14	15.50	16.89	19.80	21.30	24.37	34.15*	44.58*
	70	10.08	11.24	13.96	15.43	16.96	18.54	21.80	23.48	26.93	37.87*	49.53*
	80	10.68	11.99	15.03	16.68	18.38	20.13	23.74	25.60	29.40	41.46*	54.30*
200	5	4.33	4.51	5.05	5.34	5.63	5.93	6.53	6.83	7.43	9.32*	11.36*
	10	5.34	5.61	6.34	6.73	7.13	7.53	8.36	8.78	9.64	12.42*	15.44*
	20	6.72	7.14	8.20	8.77	9.37	9.97	11.23	11.89	13.23	17.62*	22.42*
	30	7.77	8.32	9.70	10.45	11.23	12.03	13.71	14.58	16.39	22.26*	28.61*
	40	8.65	9.35	11.03	11.95	12.91	13.91	15.99	17.08	19.32	26.55*	34.33*
	60	10.15	11.12	13.42	14.68	16.00	17.36	20.21	21.69	24.73	34.45*	44.86*
	70	10.82	11.92	14.54	15.96	17.45	18.99	22.20	23.86	27.28	38.16*	49.79*
	80	11.44	12.69	15.61	17.20	18.86	20.57	24.13	25.97	29.74	41.74*	54.56*
250	5	4.59	4.78	5.33	5.63	5.93	6.24	6.85	7.15	7.77	9.69*	11.76*
	10	5.68	5.95	6.69	7.09	7.50	7.91	8.75	9.18	10.04	12.81*	15.84*
	20	7.15	7.57	8.64	9.22	9.81	10.42	11.67	12.32	13.65	18.00*	22.77*
	30	8.26	8.81	10.19	10.93	11.70	12.50	14.16	15.02	16.79	22.60*	28.94*
	40	9.19	9.88	11.55	12.46	13.40	14.38	16.43	17.50	19.70	26.87*	34.64*
	60	10.77	11.71	13.97	15.20	16.49	17.82	20.62	22.08	25.08	34.75*	45.14*
	70	11.46	12.53	15.08	16.48	17.93	19.44	22.60	24.24	27.62	38.44*	50.06*
	80	12.11	13.31	16.15	17.71	19.33	21.01	24.51	26.33	30.07	42.02*	54.82*
300	5	4.82	5.01	5.58	5.89	6.20	6.51	7.14	7.45	8.07	10.03*	12.12*
	10	5.97	6.25	7.01	7.42	7.84	8.26	9.11	9.54	10.41	13.19*	16.23*
	20	7.53	7.95	9.04	9.62	10.22	10.83	12.08	12.73	14.05	18.37*	23.13*
	30	8.70	9.25	10.63	11.38	12.15	12.94	14.58	15.43	17.19	22.95*	29.26*
	40	9.67	10.35	12.02	12.92	13.86	14.83	16.85	17.90	20.08	27.20*	34.94*
	60	11.31	12.24	14.47	15.69	16.95	18.27	21.03	22.46	25.43	35.04*	45.41*
	70	12.03	13.09	15.60	16.96	18.39	19.88	22.99	24.61	27.96	38.73*	50.33*
	80	12.71	13.88	16.67	18.20	19.79	21.44	24.90	26.69	30.40	42.29*	55.08*
400	5	5.21	5.42	6.02	6.34	6.66	6.99	7.64	7.96	8.61	10.63*	12.79*
	10	6.48	6.77	7.57	7.99	8.42	8.85	9.73	10.17	11.06	13.88*	16.95*
	20	8.19	8.61	9.73	10.33	10.94	11.55	12.82	13.47	14.78	19.08*	23.82*
	30	9.45	10.01	11.41	12.17	12.94	13.73	15.36	16.20	17.94	23.63*	29.91*
	40	10.51	11.19	12.86	13.77	14.70	15.66	17.65	18.68	20.82	27.84*	35.55*
	60	12.27	13.18	15.39	16.59	17.83	19.12	21.81	23.22	26.13	35.63*	45.96*
	70	13.04	14.07	16.54	17.88	19.27	20.72	23.76	25.35	28.63	39.30*	50.86*
	80	13.76	14.90	17.63	19.12	20.66	22.27	25.65	27.41	31.05	42.84*	55.59*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.0 m (RADIUS = 4.9 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	5	0.64	0.69	0.81	0.88	0.94	1.01	1.15	1.22	1.36	1.78*	2.19*	
	10	0.71	0.78	0.94	1.03	1.12	1.20	1.38	1.47	1.65	2.19*	2.74*	
	20	0.83	0.94	1.17	1.28	1.40	1.52	1.76	1.89	2.13	2.89*	3.66*	
	30	0.94	1.07	1.36	1.51	1.65	1.80	2.10	2.25	2.56	3.50*	4.46*	
	40	1.03	1.20	1.54	1.71	1.89	2.06	2.41	2.59	2.95	4.06*	5.20*	
	60	1.21	1.43	1.87	2.09	2.31	2.53	2.98	3.20	3.66	5.08*	6.56*	
	70	1.29	1.54	2.02	2.26	2.51	2.75	3.24	3.49	4.00	5.56*	7.19*	
	80	1.37	1.64	2.17	2.43	2.70	2.96	3.50	3.77	4.32	6.03*	7.80*	
10	5	0.84	0.87	0.98	1.04	1.10	1.16	1.29	1.36	1.49	1.88*	2.29*	
	10	0.94	0.98	1.12	1.19	1.27	1.35	1.51	1.59	1.76	2.28*	2.83*	
	20	1.09	1.15	1.33	1.43	1.54	1.65	1.88	1.99	2.23	2.96*	3.73*	
	30	1.20	1.28	1.52	1.65	1.78	1.92	2.20	2.35	2.65	3.57*	4.53*	
	40	1.30	1.41	1.69	1.84	2.00	2.17	2.51	2.68	3.03	4.12*	5.27*	
	60	1.47	1.63	2.00	2.21	2.42	2.63	3.06	3.29	3.74	5.14*	6.61*	
	70	1.55	1.73	2.15	2.38	2.61	2.85	3.33	3.57	4.07	5.62*	7.25*	
	80	1.63	1.83	2.30	2.55	2.80	3.06	3.58	3.85	4.39	6.08*	7.86*	
20	5	0.92	0.95	1.06	1.12	1.19	1.25	1.38	1.45	1.58	1.98*	2.39*	
	10	1.05	1.09	1.22	1.30	1.37	1.45	1.61	1.70	1.86	2.37*	2.91*	
	20	1.22	1.28	1.46	1.56	1.66	1.76	1.98	2.09	2.32	3.04*	3.80*	
	30	1.35	1.43	1.65	1.77	1.90	2.03	2.30	2.44	2.73	3.64*	4.60*	
	40	1.46	1.56	1.82	1.97	2.12	2.28	2.60	2.77	3.11	4.19*	5.33*	
	60	1.65	1.79	2.13	2.32	2.52	2.73	3.15	3.37	3.81	5.20*	6.67*	
	70	1.74	1.89	2.28	2.49	2.71	2.94	3.41	3.65	4.14	5.68*	7.30*	
	80	1.82	1.99	2.42	2.66	2.90	3.15	3.66	3.92	4.46	6.14*	7.91*	
50	5	1.07	1.10	1.22	1.29	1.36	1.43	1.57	1.63	1.77	2.18*	2.61*	
	10	1.24	1.28	1.42	1.50	1.59	1.67	1.83	1.92	2.09	2.60*	3.14*	
	20	1.46	1.52	1.71	1.81	1.91	2.02	2.23	2.34	2.57	3.26*	4.02*	
	30	1.63	1.70	1.93	2.05	2.17	2.30	2.56	2.70	2.97	3.84*	4.79*	
	40	1.77	1.86	2.12	2.26	2.40	2.55	2.86	3.02	3.34	4.38*	5.51*	
	60	2.00	2.12	2.45	2.62	2.81	3.00	3.40	3.60	4.03	5.38*	6.84*	
	70	2.10	2.24	2.60	2.79	3.00	3.21	3.65	3.88	4.35	5.85*	7.46*	
	80	2.20	2.35	2.74	2.95	3.18	3.41	3.89	4.14	4.66	6.30*	8.06*	
100	5	1.22	1.26	1.39	1.46	1.53	1.61	1.76	1.83	1.98	2.41*	2.87*	
	10	1.43	1.48	1.64	1.72	1.81	1.90	2.08	2.17	2.34	2.87*	3.44*	
	20	1.72	1.78	1.97	2.08	2.19	2.30	2.53	2.64	2.87	3.57*	4.33*	
	30	1.92	2.00	2.23	2.36	2.49	2.62	2.89	3.02	3.30	4.16*	5.10*	
	40	2.09	2.18	2.45	2.59	2.74	2.89	3.20	3.36	3.68	4.69*	5.81*	
	60	2.37	2.49	2.82	3.00	3.18	3.37	3.75	3.95	4.36	5.67*	7.11*	
	70	2.50	2.63	2.98	3.18	3.38	3.58	4.01	4.23	4.68	6.13*	7.72*	
	80	2.61	2.75	3.14	3.35	3.57	3.79	4.25	4.49	4.98	6.57*	8.32*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.0 m (RADIUS = 4.9 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX		CEILING HEIGHT, m											
TEMPERATURE RISE		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
150	5	1.33	1.37	1.51	1.58	1.66	1.74	1.90	1.97	2.13	2.58*	3.06*	
	10	1.58	1.62	1.79	1.88	1.97	2.07	2.25	2.35	2.53	3.09*	3.68*	
	20	1.90	1.96	2.17	2.29	2.40	2.52	2.75	2.87	3.11	3.82*	4.61*	
	30	2.13	2.21	2.46	2.59	2.73	2.86	3.14	3.28	3.56	4.43*	5.38*	
	40	2.33	2.42	2.70	2.85	3.00	3.16	3.47	3.63	3.95	4.97*	6.08*	
	60	2.65	2.76	3.10	3.28	3.47	3.66	4.05	4.25	4.65	5.94*	7.37*	
	70	2.78	2.91	3.28	3.48	3.68	3.89	4.31	4.53	4.97	6.40*	7.98*	
	80	2.91	3.05	3.45	3.66	3.88	4.10	4.56	4.80	5.28	6.84*	8.57*	
200	5	1.42	1.46	1.60	1.68	1.77	1.85	2.01	2.09	2.25	2.72*	3.22*	
	10	1.69	1.74	1.91	2.01	2.11	2.20	2.40	2.50	2.69	3.26*	3.88*	
	20	2.05	2.11	2.33	2.45	2.57	2.69	2.94	3.06	3.30	4.04*	4.84*	
	30	2.30	2.39	2.64	2.78	2.92	3.06	3.35	3.49	3.78	4.66*	5.63*	
	40	2.52	2.61	2.90	3.06	3.22	3.38	3.70	3.86	4.19	5.21*	6.34*	
	60	2.87	2.99	3.33	3.52	3.71	3.91	4.30	4.50	4.91	6.19*	7.63*	
	70	3.01	3.15	3.52	3.73	3.93	4.14	4.57	4.79	5.23	6.65*	8.23*	
	80	3.15	3.30	3.70	3.92	4.14	4.37	4.83	5.06	5.55	7.09*	8.82*	
250	5	1.50	1.54	1.69	1.77	1.85	1.94	2.11	2.19	2.36	2.84*	3.36*	
	10	1.79	1.84	2.02	2.12	2.22	2.32	2.52	2.62	2.82	3.41*	4.05*	
	20	2.17	2.24	2.47	2.59	2.72	2.84	3.09	3.22	3.47	4.23*	5.05*	
	30	2.45	2.54	2.80	2.94	3.09	3.24	3.53	3.68	3.97	4.87*	5.86*	
	40	2.68	2.78	3.08	3.24	3.40	3.57	3.90	4.06	4.40	5.43*	6.58*	
	60	3.05	3.18	3.54	3.73	3.92	4.12	4.52	4.73	5.14	6.43*	7.87*	
	70	3.21	3.35	3.74	3.94	4.15	4.37	4.80	5.02	5.47	6.89*	8.47*	
	80	3.36	3.51	3.92	4.14	4.37	4.60	5.07	5.31	5.79	7.33*	9.05*	
300	5	1.56	1.60	1.76	1.85	1.93	2.02	2.19	2.28	2.45	2.95*	3.48*	
	10	1.87	1.93	2.11	2.22	2.32	2.43	2.63	2.74	2.94	3.55*	4.20*	
	20	2.28	2.36	2.59	2.72	2.85	2.98	3.23	3.36	3.62	4.40*	5.24*	
	30	2.58	2.67	2.94	3.09	3.24	3.39	3.69	3.84	4.14	5.06*	6.07*	
	40	2.82	2.93	3.23	3.40	3.56	3.73	4.07	4.24	4.58	5.64*	6.80*	
	60	3.22	3.35	3.71	3.91	4.11	4.31	4.72	4.93	5.35	6.65*	8.10*	
	70	3.39	3.53	3.92	4.14	4.35	4.57	5.01	5.24	5.69	7.11*	8.70*	
	80	3.55	3.70	4.12	4.34	4.57	4.81	5.28	5.52	6.01	7.55*	9.28*	
400	5	1.68	1.72	1.89	1.98	2.07	2.16	2.34	2.43	2.61	3.13*	3.70*	
	10	2.02	2.08	2.28	2.39	2.50	2.61	2.82	2.93	3.15	3.78*	4.47*	
	20	2.47	2.55	2.80	2.93	3.07	3.21	3.48	3.61	3.88	4.69*	5.57*	
	30	2.80	2.90	3.18	3.34	3.50	3.65	3.97	4.13	4.44	5.39*	6.44*	
	40	3.07	3.18	3.50	3.67	3.85	4.03	4.38	4.56	4.91	6.00*	7.20*	
	60	3.51	3.64	4.02	4.23	4.44	4.65	5.07	5.29	5.72	7.04*	8.52*	
	70	3.69	3.84	4.25	4.47	4.70	4.92	5.38	5.61	6.07	7.52*	9.13*	
	80	3.87	4.02	4.46	4.70	4.93	5.18	5.67	5.91	6.41	7.97*	9.72*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.0 m (RADIUS = 4.9 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE	CEILING HEIGHT, m										
			1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}	°C	0	0.92	1.00	1.20	1.31	1.42	1.53	1.75	1.86	2.08	2.76*	3.44*
			1.06	1.18	1.47	1.61	1.76	1.91	2.20	2.35	2.66	3.58*	4.53*
			1.30	1.50	1.91	2.12	2.33	2.54	2.97	3.19	3.63	4.98*	6.37*
			1.51	1.77	2.30	2.57	2.84	3.10	3.65	3.92	4.48	6.20*	7.98*
			1.70	2.03	2.66	2.98	3.30	3.62	4.27	4.60	5.26	7.32*	9.46*
			2.05	2.49	3.32	3.73	4.14	4.56	5.40	5.83	6.69	9.37*	12.17*
			2.21	2.70	3.63	4.08	4.54	5.00	5.93	6.40	7.36	10.33*	13.44*
			2.37	2.91	3.92	4.42	4.92	5.42	6.44	6.96	8.01	11.26*	14.66*
10	5	1.19	1.24	1.41	1.50	1.60	1.70	1.90	2.00	2.21	2.87*	3.54*	
		1.36	1.44	1.66	1.79	1.92	2.06	2.34	2.48	2.77	3.68*	4.62*	
		1.62	1.74	2.09	2.28	2.47	2.68	3.09	3.30	3.73	5.05*	6.44*	
		1.82	2.00	2.46	2.71	2.96	3.22	3.75	4.02	4.57	6.27*	8.05*	
		2.01	2.24	2.81	3.11	3.42	3.73	4.36	4.69	5.34	7.38*	9.52*	
		2.34	2.69	3.46	3.85	4.25	4.66	5.49	5.91	6.77	9.43*	12.23*	
		2.49	2.90	3.76	4.20	4.65	5.10	6.02	6.48	7.43	10.39*	13.49*	
		2.65	3.10	4.05	4.53	5.02	5.52	6.52	7.04	8.07	11.31*	14.71*	
20	5	1.32	1.36	1.53	1.63	1.73	1.82	2.03	2.13	2.33	2.97*	3.64*	
		1.52	1.59	1.81	1.94	2.06	2.19	2.46	2.60	2.88	3.77*	4.70*	
		1.81	1.92	2.24	2.42	2.61	2.80	3.20	3.40	3.82	5.13*	6.52*	
		2.04	2.19	2.62	2.85	3.09	3.34	3.85	4.12	4.65	6.34*	8.11*	
		2.23	2.44	2.96	3.24	3.54	3.84	4.46	4.78	5.42	7.45*	9.58*	
		2.58	2.88	3.59	3.97	4.36	4.76	5.57	5.99	6.84	9.49*	12.28*	
		2.74	3.08	3.89	4.31	4.75	5.19	6.10	6.56	7.50	10.45*	13.55*	
		2.89	3.28	4.18	4.65	5.12	5.61	6.60	7.11	8.14	11.37*	14.76*	
50	5	1.54	1.59	1.77	1.87	1.98	2.08	2.29	2.39	2.60	3.24*	3.92*	
		1.81	1.88	2.11	2.24	2.36	2.50	2.76	2.90	3.17	4.03*	4.96*	
		2.18	2.28	2.60	2.77	2.95	3.13	3.51	3.70	4.10	5.36*	6.73*	
		2.45	2.60	2.99	3.21	3.43	3.66	4.15	4.40	4.91	6.55*	8.31*	
		2.69	2.86	3.34	3.60	3.87	4.15	4.74	5.04	5.66	7.65*	9.77*	
		3.08	3.33	3.97	4.31	4.68	5.05	5.83	6.23	7.06	9.67*	12.45*	
		3.26	3.54	4.26	4.65	5.05	5.47	6.35	6.79	7.71	10.62*	13.71*	
		3.42	3.75	4.54	4.97	5.42	5.88	6.84	7.34	8.35	11.53*	14.92*	
100	5	1.78	1.83	2.03	2.13	2.24	2.35	2.58	2.69	2.91	3.57*	4.28*	
		2.11	2.18	2.43	2.56	2.70	2.84	3.12	3.25	3.54	4.40*	5.34*	
		2.56	2.67	2.99	3.17	3.35	3.54	3.91	4.11	4.49	5.73*	7.08*	
		2.89	3.04	3.43	3.65	3.87	4.10	4.57	4.81	5.31	6.89*	8.63*	
		3.17	3.35	3.81	4.07	4.33	4.60	5.16	5.45	6.05	7.97*	10.07*	
		3.64	3.87	4.47	4.80	5.15	5.50	6.24	6.62	7.42	9.96*	12.73*	
		3.84	4.10	4.77	5.14	5.52	5.92	6.75	7.17	8.06	10.90*	13.97*	
		4.03	4.32	5.06	5.46	5.89	6.32	7.23	7.71	8.68	11.81*	15.18*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.0 m (RADIUS = 4.9 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE		CEILING HEIGHT, m											
(m*s) ^{1/2}		1	2	4	5	6	7	9	10	12	18	24			
150	5	1.94	2.00	2.21	2.32	2.44	2.55	2.79	2.90	3.13	3.82*	4.56*			
	10	2.33	2.40	2.66	2.80	2.95	3.09	3.38	3.52	3.81	4.70*	5.66*			
	20	2.84	2.95	3.29	3.47	3.66	3.85	4.24	4.43	4.82	6.06*	7.42*			
	30	3.22	3.36	3.77	3.99	4.22	4.45	4.92	5.16	5.65	7.22*	8.95*			
	40	3.53	3.70	4.18	4.44	4.70	4.97	5.53	5.81	6.40	8.28*	10.37*			
	60	4.05	4.28	4.88	5.21	5.54	5.89	6.62	6.99	7.76	10.25*	13.00*			
	70	4.27	4.53	5.19	5.55	5.93	6.32	7.12	7.54	8.40	11.18*	14.24*			
	80	4.48	4.77	5.49	5.89	6.30	6.72	7.60	8.06	9.01	12.08*	15.43*			
200	5	2.08	2.14	2.36	2.48	2.60	2.72	2.96	3.08	3.32	4.03*	4.79*			
	10	2.50	2.58	2.85	3.00	3.15	3.30	3.60	3.75	4.05	4.95*	5.94*			
	20	3.06	3.18	3.53	3.72	3.91	4.11	4.51	4.70	5.10	6.35*	7.72*			
	30	3.48	3.62	4.05	4.27	4.51	4.74	5.22	5.47	5.96	7.52*	9.25*			
	40	3.82	3.99	4.48	4.74	5.01	5.29	5.85	6.13	6.72	8.58*	10.66*			
	60	4.38	4.61	5.22	5.55	5.89	6.24	6.95	7.32	8.08	10.54*	13.27*			
	70	4.62	4.88	5.55	5.91	6.28	6.67	7.46	7.87	8.72	11.46*	14.50*			
	80	4.85	5.13	5.86	6.25	6.66	7.08	7.95	8.40	9.33	12.35*	15.69*			
250	5	2.20	2.26	2.48	2.61	2.73	2.86	3.11	3.23	3.48	4.21*	5.00*			
	10	2.65	2.74	3.02	3.17	3.32	3.48	3.79	3.94	4.25	5.18*	6.19*			
	20	3.26	3.38	3.74	3.93	4.13	4.34	4.74	4.94	5.35	6.61*	8.01*			
	30	3.70	3.85	4.28	4.52	4.76	5.00	5.49	5.73	6.23	7.80*	9.54*			
	40	4.07	4.25	4.74	5.01	5.29	5.56	6.13	6.42	7.01	8.87*	10.95*			
	60	4.67	4.90	5.52	5.85	6.19	6.54	7.26	7.63	8.38	10.82*	13.54*			
	70	4.93	5.18	5.86	6.22	6.60	6.98	7.78	8.18	9.02	11.73*	14.76*			
	80	5.17	5.45	6.18	6.58	6.98	7.40	8.27	8.71	9.63	12.62*	15.94*			
300	5	2.30	2.36	2.60	2.72	2.85	2.98	3.24	3.37	3.62	4.37*	5.18*			
	10	2.79	2.87	3.16	3.32	3.48	3.63	3.95	4.11	4.43	5.38*	6.41*			
	20	3.43	3.55	3.92	4.12	4.33	4.54	4.95	5.16	5.57	6.85*	8.27*			
	30	3.90	4.05	4.50	4.74	4.98	5.23	5.72	5.97	6.48	8.06*	9.82*			
	40	4.29	4.47	4.98	5.25	5.53	5.81	6.39	6.68	7.27	9.14*	11.22*			
	60	4.92	5.16	5.78	6.12	6.47	6.82	7.54	7.91	8.67	11.09*	13.80*			
	70	5.20	5.45	6.14	6.51	6.89	7.27	8.07	8.47	9.31	12.00*	15.02*			
	80	5.45	5.73	6.47	6.87	7.28	7.70	8.56	9.01	9.92	12.88*	16.19*			
400	5	2.48	2.54	2.79	2.92	3.06	3.19	3.46	3.60	3.86	4.65*	5.50*			
	10	3.01	3.11	3.41	3.57	3.74	3.91	4.24	4.41	4.74	5.73*	6.81*			
	20	3.72	3.85	4.24	4.45	4.67	4.89	5.32	5.53	5.96	7.28*	8.74*			
	30	4.24	4.40	4.87	5.12	5.37	5.63	6.14	6.40	6.92	8.53*	10.32*			
	40	4.67	4.85	5.38	5.67	5.96	6.25	6.84	7.14	7.74	9.63*	11.74*			
	60	5.36	5.60	6.25	6.60	6.95	7.31	8.05	8.42	9.18	11.60*	14.31*			
	70	5.66	5.92	6.63	7.01	7.39	7.79	8.59	9.00	9.83	12.51*	15.52*			
	80	5.94	6.22	6.98	7.39	7.81	8.23	9.10	9.55	10.46	13.39*	16.68*			

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.0 m (RADIUS = 4.9 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m														
			0	1	2	4	5	6	7	9	10	12	18	24		
(m*s) ^{1/2}	°C															
0	5		1.35	1.50	1.85	2.03	2.21	2.39	2.76	2.95	3.32	4.46*	5.63*			
	10		1.64	1.88	2.38	2.64	2.89	3.15	3.68	3.94	4.48	6.12*	7.81*			
	20		2.11	2.50	3.27	3.66	4.04	4.43	5.21	5.61	6.42	8.90*	11.49*			
	30		2.53	3.05	4.05	4.55	5.05	5.55	6.56	7.08	8.12	11.34*	14.71*			
	40		2.91	3.56	4.77	5.37	5.97	6.58	7.80	8.42	9.68	13.59*	17.67*			
	60		3.62	4.48	6.09	6.87	7.67	8.46	10.07	10.89	12.54	17.69*	23.09*			
	70		3.94	4.92	6.70	7.58	8.46	9.34	11.13	12.04	13.88	19.61*	25.63*			
	80		4.26	5.33	7.29	8.26	9.22	10.19	12.15	13.15	15.17	21.46*	28.07*			
10	5		1.72	1.80	2.08	2.24	2.41	2.57	2.92	3.10	3.46	4.57*	5.73*			
	10		2.01	2.17	2.59	2.82	3.06	3.31	3.81	4.07	4.59	6.21*	7.90*			
	20		2.48	2.76	3.45	3.81	4.18	4.56	5.33	5.72	6.51	8.98*	11.56*			
	30		2.87	3.29	4.22	4.69	5.18	5.67	6.67	7.17	8.21	11.42*	14.78*			
	40		3.24	3.78	4.92	5.50	6.09	6.69	7.90	8.51	9.76	13.65*	17.74*			
	60		3.91	4.69	6.22	7.00	7.77	8.56	10.16	10.97	12.62	17.75*	23.15*			
	70		4.23	5.11	6.83	7.69	8.56	9.44	11.21	12.12	13.95	19.67*	25.68*			
	80		4.54	5.52	7.42	8.37	9.32	10.28	12.23	13.23	15.24	21.52*	28.12*			
20	5		1.90	1.99	2.26	2.41	2.57	2.74	3.07	3.24	3.59	4.68*	5.83*			
	10		2.24	2.38	2.78	2.99	3.22	3.46	3.94	4.19	4.70	6.30*	7.99*			
	20		2.75	2.99	3.62	3.97	4.33	4.69	5.44	5.83	6.61	9.06*	11.64*			
	30		3.16	3.52	4.38	4.83	5.31	5.79	6.77	7.27	8.29	11.49*	14.85*			
	40		3.53	4.00	5.07	5.64	6.21	6.80	7.99	8.60	9.84	13.72*	17.80*			
	60		4.19	4.88	6.36	7.12	7.88	8.66	10.24	11.05	12.69	17.81*	23.21*			
	70		4.50	5.30	6.96	7.81	8.67	9.53	11.30	12.20	14.02	19.73*	25.74*			
	80		4.81	5.71	7.55	8.48	9.42	10.38	12.32	13.30	15.31	21.57*	28.18*			
50	5		2.25	2.33	2.61	2.77	2.93	3.09	3.43	3.59	3.93	4.99*	6.13*			
	10		2.68	2.81	3.19	3.40	3.62	3.85	4.31	4.55	5.03	6.58*	8.25*			
	20		3.29	3.50	4.08	4.39	4.72	5.06	5.77	6.14	6.90	9.29*	11.86*			
	30		3.76	4.06	4.82	5.24	5.68	6.13	7.07	7.56	8.55	11.70*	15.04*			
	40		4.16	4.55	5.50	6.03	6.57	7.12	8.28	8.87	10.09	13.92*	17.98*			
	60		4.87	5.43	6.76	7.47	8.21	8.96	10.50	11.29	12.91	17.99*	23.37*			
	70		5.19	5.85	7.35	8.15	8.98	9.82	11.55	12.43	14.23	19.90*	25.90*			
	80		5.50	6.24	7.93	8.81	9.73	10.65	12.56	13.53	15.51	21.74*	28.33*			
100	5		2.60	2.69	2.99	3.16	3.33	3.50	3.84	4.02	4.37	5.43*	6.58*			
	10		3.14	3.27	3.67	3.88	4.11	4.33	4.79	5.03	5.51	7.01*	8.66*			
	20		3.87	4.07	4.64	4.95	5.27	5.60	6.28	6.63	7.35	9.68*	12.22*			
	30		4.42	4.70	5.43	5.83	6.24	6.67	7.56	8.02	8.98	12.05*	15.37*			
	40		4.89	5.24	6.12	6.61	7.12	7.64	8.74	9.31	10.49	14.24*	18.29*			
	60		5.68	6.17	7.38	8.04	8.73	9.44	10.93	11.70	13.28	18.29*	23.65*			
	70		6.03	6.60	7.96	8.71	9.49	10.29	11.96	12.82	14.59	20.19*	26.16*			
	80		6.36	7.00	8.53	9.36	10.22	11.11	12.96	13.91	15.85	22.02*	28.59*			

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.0 m (RADIUS = 4.9 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
150 (m*s) ^{1/2}	5	2.86	2.95	3.27	3.45	3.62	3.80	4.16	4.34	4.70	5.79*	6.97*
	10	3.47	3.60	4.02	4.24	4.47	4.70	5.18	5.42	5.90	7.40*	9.06*
	20	4.29	4.50	5.07	5.39	5.71	6.04	6.72	7.06	7.77	10.05*	12.57*
	30	4.91	5.18	5.91	6.30	6.71	7.13	8.01	8.46	9.39	12.40*	15.70*
	40	5.42	5.76	6.64	7.11	7.61	8.12	9.18	9.74	10.88	14.57*	18.59*
	60	6.29	6.76	7.92	8.56	9.22	9.91	11.35	12.09	13.64	18.58*	23.93*
	70	6.67	7.20	8.51	9.22	9.97	10.74	12.36	13.20	14.94	20.47*	26.43*
	80	7.03	7.62	9.07	9.87	10.70	11.56	13.35	14.28	16.19	22.30*	28.85*
200	5	3.07	3.17	3.50	3.68	3.86	4.05	4.42	4.60	4.97	6.09*	7.30*
	10	3.74	3.88	4.30	4.54	4.77	5.01	5.50	5.74	6.23	7.75*	9.42*
	20	4.63	4.84	5.43	5.75	6.08	6.41	7.09	7.44	8.15	10.41*	12.92*
	30	5.30	5.58	6.31	6.71	7.12	7.54	8.41	8.86	9.77	12.74*	16.02*
	40	5.86	6.20	7.07	7.55	8.04	8.54	9.59	10.14	11.26	14.89*	18.90*
	60	6.79	7.25	8.40	9.02	9.67	10.34	11.75	12.48	13.99	18.88*	24.20*
	70	7.20	7.71	9.00	9.70	10.42	11.18	12.76	13.58	15.28	20.75*	26.70*
	80	7.58	8.15	9.57	10.34	11.15	11.98	13.74	14.65	16.53	22.57*	29.11*
250	5	3.25	3.35	3.69	3.88	4.07	4.26	4.64	4.83	5.21	6.36*	7.60*
	10	3.97	4.11	4.55	4.79	5.04	5.28	5.78	6.03	6.53	8.07*	9.76*
	20	4.93	5.14	5.75	6.07	6.41	6.74	7.43	7.78	8.49	10.75*	13.26*
	30	5.64	5.92	6.67	7.07	7.49	7.91	8.78	9.22	10.13	13.07*	16.34*
	40	6.24	6.57	7.46	7.93	8.43	8.93	9.97	10.51	11.62	15.21*	19.20*
	60	7.22	7.68	8.82	9.44	10.08	10.75	12.13	12.85	14.34	19.17*	24.48*
	70	7.65	8.16	9.43	10.13	10.84	11.59	13.14	13.95	15.62	21.04*	26.96*
	80	8.05	8.62	10.02	10.78	11.57	12.39	14.11	15.01	16.86	22.84*	29.36*
300	5	3.40	3.51	3.86	4.06	4.25	4.45	4.84	5.04	5.43	6.60*	7.87*
	10	4.17	4.32	4.77	5.02	5.27	5.52	6.03	6.28	6.79	8.35*	10.07*
	20	5.19	5.41	6.02	6.36	6.70	7.04	7.74	8.09	8.81	11.06*	13.58*
	30	5.95	6.23	6.98	7.39	7.81	8.24	9.11	9.56	10.47	13.39*	16.65*
	40	6.57	6.91	7.80	8.28	8.78	9.28	10.33	10.86	11.96	15.52*	19.49*
	60	7.61	8.06	9.21	9.83	10.47	11.13	12.50	13.21	14.68	19.46*	24.75*
	70	8.06	8.57	9.83	10.52	11.23	11.97	13.51	14.30	15.95	21.32*	27.22*
	80	8.48	9.04	10.43	11.18	11.97	12.78	14.48	15.36	17.19	23.12*	29.62*
400	5	3.68	3.79	4.16	4.36	4.57	4.77	5.19	5.39	5.80	7.01*	8.34*
	10	4.52	4.67	5.15	5.41	5.67	5.94	6.46	6.73	7.25	8.86*	10.63*
	20	5.64	5.87	6.51	6.85	7.21	7.56	8.28	8.64	9.37	11.65*	14.20*
	30	6.47	6.76	7.54	7.96	8.39	8.82	9.71	10.16	11.08	13.99*	17.26*
	40	7.15	7.50	8.41	8.90	9.40	9.91	10.96	11.50	12.60	16.12*	20.08*
	60	8.28	8.73	9.89	10.51	11.15	11.81	13.18	13.88	15.33	20.03*	25.29*
	70	8.76	9.27	10.54	11.23	11.94	12.68	14.19	14.98	16.60	21.87*	27.75*
	80	9.22	9.77	11.16	11.92	12.70	13.50	15.17	16.03	17.82	23.66*	30.13*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.0 m (RADIUS = 4.9 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
0	5	2.07	2.36	2.97	3.28	3.60	3.92	4.56	4.88	5.53	7.54*	9.61*	
	10	2.64	3.10	4.03	4.50	4.96	5.43	6.39	6.87	7.84	10.85*	13.98*	
	20	3.59	4.36	5.81	6.54	7.26	7.99	9.46	10.21	11.72	16.42*	21.33*	
	30	4.42	5.46	7.38	8.32	9.27	10.23	12.16	13.14	15.13	21.30*	27.78*	
	40	5.19	6.47	8.81	9.97	11.12	12.28	14.64	15.83	18.25	25.79*	33.70*	
	60	6.59	8.32	11.44	12.97	14.51	16.05	19.18	20.76	23.98	34.00*	44.54*	
	70	7.25	9.18	12.67	14.38	16.09	17.81	21.30	23.06	26.65	37.84*	49.61*	
	80	7.88	10.02	13.86	15.74	17.62	19.51	23.34	25.29	29.23	41.54*	54.50*	
10	5	2.52	2.70	3.22	3.50	3.80	4.10	4.72	5.03	5.67	7.65*	9.71*	
	10	3.07	3.41	4.24	4.68	5.13	5.59	6.52	7.00	7.96	10.95*	14.07*	
	20	3.97	4.62	5.99	6.69	7.40	8.12	9.58	10.32	11.82	16.50*	21.41*	
	30	4.78	5.70	7.54	8.47	9.40	10.35	12.26	13.24	15.22	21.38*	27.85*	
	40	5.52	6.69	8.97	10.10	11.24	12.40	14.73	15.92	18.33	25.85*	33.76*	
	60	6.89	8.52	11.58	13.10	14.62	16.15	19.26	20.84	24.05	34.06*	44.60*	
	70	7.54	9.38	12.81	14.50	16.20	17.91	21.38	23.14	26.72	37.90*	49.66*	
	80	8.16	10.21	13.99	15.85	17.72	19.60	23.42	25.36	29.30	41.60*	54.55*	
20	5	2.79	2.96	3.44	3.71	3.99	4.28	4.88	5.18	5.81	7.76*	9.82*	
	10	3.39	3.68	4.45	4.87	5.30	5.74	6.66	7.12	8.07	11.04*	14.15*	
	20	4.32	4.88	6.17	6.85	7.55	8.25	9.69	10.43	11.92	16.58*	21.48*	
	30	5.11	5.93	7.70	8.61	9.53	10.47	12.37	13.34	15.30	21.45*	27.91*	
	40	5.84	6.91	9.12	10.23	11.36	12.51	14.83	16.01	18.42	25.92*	33.82*	
	60	7.19	8.72	11.72	13.22	14.73	16.25	19.35	20.92	24.12	34.12*	44.65*	
	70	7.82	9.57	12.94	14.61	16.30	18.00	21.46	23.22	26.79	37.95*	49.72*	
	80	8.44	10.39	14.11	15.96	17.82	19.70	23.50	25.44	29.37	41.65*	54.60*	
50	5	3.31	3.46	3.94	4.20	4.47	4.74	5.31	5.60	6.20	8.09*	10.12*	
	10	4.03	4.29	4.99	5.37	5.77	6.19	7.05	7.50	8.41	11.32*	14.42*	
	20	5.08	5.54	6.69	7.31	7.97	8.64	10.03	10.75	12.21	16.81*	21.70*	
	30	5.92	6.59	8.18	9.03	9.92	10.82	12.68	13.63	15.57	21.66*	28.11*	
	40	6.66	7.55	9.56	10.63	11.72	12.84	15.12	16.28	18.66	26.12*	34.01*	
	60	8.01	9.31	12.13	13.58	15.05	16.55	19.61	21.17	24.35	34.30*	44.82*	
	70	8.63	10.14	13.33	14.96	16.62	18.29	21.71	23.46	27.01	38.13*	49.88*	
	80	9.23	10.95	14.50	16.30	18.13	19.98	23.75	25.67	29.58	41.82*	54.76*	
100	5	3.85	4.01	4.50	4.77	5.04	5.32	5.89	6.17	6.76	8.61*	10.62*	
	10	4.72	4.97	5.66	6.03	6.42	6.82	7.65	8.08	8.96	11.77*	14.84*	
	20	5.93	6.35	7.42	8.01	8.62	9.26	10.58	11.27	12.68	17.20*	22.06*	
	30	6.88	7.46	8.92	9.71	10.54	11.40	13.18	14.10	16.00	22.01*	28.44*	
	40	7.69	8.45	10.28	11.28	12.31	13.38	15.59	16.73	19.07	26.45*	34.32*	
	60	9.11	10.22	12.79	14.17	15.59	17.05	20.04	21.58	24.71	34.60*	45.10*	
	70	9.75	11.04	13.98	15.53	17.13	18.77	22.13	23.85	27.36	38.41*	50.15*	
	80	10.36	11.83	15.12	16.85	18.63	20.44	24.15	26.05	29.92	42.10*	55.02*	

SPACING = 7.0 m (RADIUS = 4.9 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TEMPERATURE
 TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	4.25	4.41	4.92	5.19	5.48	5.76	6.34	6.63	7.22	9.07*	11.09*
	10	5.22	5.47	6.17	6.55	6.95	7.35	8.17	8.59	9.45	12.22*	15.27*
	20	6.57	6.98	8.03	8.61	9.20	9.82	11.11	11.77	13.15	17.59*	22.43*
	30	7.60	8.16	9.56	10.32	11.12	11.95	13.68	14.58	16.43	22.37*	28.77*
	40	8.48	9.19	10.93	11.88	12.88	13.91	16.06	17.18	19.47	26.78*	34.62*
	60	9.98	11.01	13.43	14.75	16.12	17.53	20.47	21.98	25.08	34.90*	45.38*
	70	10.66	11.84	14.60	16.10	17.65	19.24	22.54	24.24	27.71	38.70*	50.41*
	80	11.29	12.63	15.73	17.40	19.13	20.90	24.55	26.42	30.26	42.38*	55.28*
200	5	4.57	4.73	5.26	5.54	5.84	6.13	6.72	7.02	7.62	9.48*	11.52*
	10	5.63	5.89	6.60	6.99	7.39	7.79	8.62	9.04	9.90	12.64*	15.68*
	20	7.09	7.49	8.55	9.12	9.72	10.33	11.59	12.25	13.60	17.97*	22.79*
	30	8.20	8.74	10.12	10.88	11.66	12.47	14.16	15.03	16.85	22.72*	29.10*
	40	9.13	9.82	11.52	12.45	13.42	14.42	16.52	17.61	19.87	27.11*	34.93*
	60	10.72	11.69	14.03	15.31	16.64	18.02	20.89	22.38	25.44	35.19*	45.65*
	70	11.42	12.54	15.20	16.64	18.15	19.71	22.95	24.63	28.07	38.99*	50.68*
	80	12.09	13.35	16.32	17.94	19.62	21.35	24.95	26.80	30.60	42.65*	55.54*
250	5	4.84	5.01	5.55	5.85	6.15	6.45	7.06	7.36	7.97	9.86*	11.92*
	10	5.99	6.24	6.97	7.37	7.78	8.19	9.02	9.45	10.31	13.04*	16.08*
	20	7.54	7.94	9.01	9.58	10.18	10.79	12.04	12.69	14.03	18.35*	23.14*
	30	8.71	9.25	10.63	11.38	12.15	12.95	14.61	15.48	17.27	23.06*	29.42*
	40	9.70	10.38	12.05	12.97	13.92	14.90	16.97	18.04	20.26	27.43*	35.23*
	60	11.36	12.31	14.59	15.84	17.14	18.49	21.31	22.78	25.81	35.49*	45.93*
	70	12.10	13.18	15.76	17.17	18.64	20.17	23.36	25.01	28.41	39.27*	50.95*
	80	12.79	14.00	16.89	18.46	20.10	21.80	25.34	27.17	30.94	42.93*	55.79*
300	5	5.08	5.26	5.81	6.12	6.42	6.73	7.35	7.66	8.29	10.20*	12.29*
	10	6.30	6.56	7.30	7.71	8.12	8.54	9.39	9.82	10.69	13.42*	16.47*
	20	7.94	8.34	9.42	10.00	10.60	11.21	12.46	13.11	14.44	18.72*	23.50*
	30	9.17	9.71	11.09	11.83	12.60	13.40	15.05	15.90	17.67	23.41*	29.75*
	40	10.20	10.87	12.54	13.45	14.39	15.37	17.40	18.46	20.65	27.76*	35.54*
	60	11.94	12.86	15.11	16.34	17.62	18.94	21.73	23.17	26.16	35.79*	46.21*
	70	12.70	13.75	16.29	17.67	19.12	20.62	23.76	25.39	28.76	39.56*	51.21*
	80	13.41	14.60	17.42	18.96	20.57	22.24	25.73	27.54	31.28	43.21*	56.05*
400	5	5.50	5.68	6.27	6.58	6.90	7.23	7.87	8.19	8.84	10.80*	12.96*
	10	6.83	7.10	7.88	8.30	8.73	9.16	10.03	10.47	11.35	14.12*	17.20*
	20	8.63	9.04	10.14	10.73	11.34	11.96	13.22	13.87	15.19	19.43*	24.19*
	30	9.97	10.51	11.90	12.65	13.42	14.22	15.85	16.70	18.44	24.09*	30.39*
	40	11.08	11.74	13.42	14.32	15.25	16.22	18.22	19.26	21.41	28.40*	36.14*
	60	12.94	13.85	16.06	17.27	18.52	19.81	22.53	23.94	26.88	36.37*	46.76*
	70	13.76	14.78	17.26	18.62	20.02	21.49	24.55	26.15	29.45	40.13*	51.74*
	80	14.51	15.66	18.41	19.91	21.47	23.10	26.51	28.28	31.95	43.76*	56.57*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.5 m (RADIUS = 5.3 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	°C	CEILING HEIGHT, m										
			1	2	4	5	6	7	9	10	12	18	24
0	5	0.68	0.72	0.84	0.91	0.98	1.05	1.18	1.25	1.39	1.52	1.81*	2.22*
		0.76	0.82	0.98	1.07	1.16	1.24	1.42	1.51	1.69	1.80	2.23*	2.78*
		0.88	0.99	1.22	1.33	1.45	1.57	1.82	1.94	2.19	2.29	3.57*	4.54*
		1.00	1.13	1.42	1.57	1.72	1.87	2.17	2.32	2.62	2.71	4.14*	5.29*
		1.10	1.26	1.61	1.78	1.96	2.13	2.49	2.67	3.03	3.11	5.19*	6.67*
		1.28	1.51	1.95	2.18	2.40	2.62	3.07	3.30	3.76	3.84	5.68*	7.32*
		1.37	1.62	2.11	2.36	2.60	2.85	3.35	3.60	4.11	4.18	6.15*	7.94*
		1.46	1.73	2.27	2.54	2.80	3.07	3.61	3.88	4.44	4.51	6.21*	8.04*
10	5	0.89	0.91	1.01	1.07	1.14	1.20	1.33	1.39	1.52	1.52	1.91*	2.33*
		1.00	1.03	1.16	1.23	1.31	1.39	1.55	1.63	1.80	1.80	2.32*	2.87*
		1.15	1.20	1.39	1.49	1.60	1.71	1.93	2.05	2.29	2.29	3.02*	3.79*
		1.27	1.35	1.58	1.71	1.85	1.99	2.27	2.42	2.71	2.71	3.64*	4.60*
		1.37	1.48	1.76	1.92	2.08	2.24	2.58	2.76	3.11	3.11	4.21*	5.35*
		1.55	1.71	2.09	2.30	2.51	2.72	3.16	3.38	3.84	3.84	5.25*	6.73*
		1.64	1.82	2.25	2.48	2.71	2.95	3.43	3.68	4.18	4.18	5.74*	7.37*
		1.72	1.92	2.40	2.65	2.91	3.17	3.69	3.96	4.51	4.51	6.21*	7.99*
20	5	0.97	1.00	1.10	1.17	1.23	1.29	1.42	1.49	1.62	1.62	2.01*	2.42*
		1.11	1.14	1.27	1.34	1.42	1.50	1.66	1.74	1.91	1.91	2.41*	2.95*
		1.29	1.34	1.52	1.61	1.72	1.82	2.04	2.15	2.38	2.38	3.10*	3.86*
		1.42	1.50	1.72	1.84	1.97	2.10	2.37	2.51	2.80	2.80	3.71*	4.67*
		1.54	1.63	1.90	2.04	2.20	2.35	2.68	2.85	3.19	3.19	4.27*	5.41*
		1.74	1.87	2.22	2.42	2.62	2.82	3.25	3.47	3.91	3.91	5.31*	6.78*
		1.83	1.98	2.38	2.59	2.82	3.04	3.52	3.76	4.25	4.25	5.79*	7.42*
		1.92	2.09	2.53	2.76	3.01	3.26	3.78	4.04	4.58	4.58	6.26*	8.04*
50	5	1.13	1.15	1.27	1.34	1.40	1.47	1.61	1.68	1.81	1.81	2.22*	2.64*
		1.31	1.34	1.48	1.56	1.64	1.72	1.89	1.97	2.14	2.14	2.64*	3.18*
		1.54	1.59	1.77	1.87	1.98	2.08	2.30	2.41	2.63	2.63	3.32*	4.07*
		1.72	1.79	2.00	2.12	2.25	2.38	2.64	2.77	3.05	3.05	3.91*	4.86*
		1.86	1.95	2.20	2.34	2.49	2.64	2.94	3.10	3.43	3.43	4.47*	5.60*
		2.11	2.22	2.55	2.73	2.91	3.10	3.50	3.71	4.13	4.13	5.49*	6.95*
		2.22	2.35	2.70	2.90	3.11	3.32	3.76	3.99	4.46	4.46	5.96*	7.58*
		2.32	2.46	2.85	3.07	3.30	3.53	4.02	4.27	4.79	4.79	6.43*	8.20*
100	5	1.29	1.32	1.44	1.51	1.59	1.66	1.81	1.88	2.02	2.02	2.45*	2.91*
		1.51	1.55	1.70	1.78	1.87	1.96	2.14	2.22	2.40	2.40	2.92*	3.49*
		1.81	1.86	2.05	2.16	2.27	2.38	2.60	2.72	2.94	2.94	3.63*	4.39*
		2.02	2.09	2.32	2.45	2.58	2.71	2.97	3.11	3.38	3.38	4.23*	5.17*
		2.20	2.29	2.55	2.69	2.84	2.99	3.30	3.45	3.77	3.77	4.77*	5.89*
		2.50	2.61	2.93	3.11	3.29	3.48	3.87	4.07	4.47	4.47	5.77*	7.22*
		2.63	2.75	3.10	3.30	3.50	3.70	4.13	4.35	4.80	4.80	6.24*	7.85*
		2.74	2.88	3.27	3.48	3.69	3.92	4.38	4.62	5.12	5.12	6.70*	8.45*

SPACING = 7.5 m (RADIUS = 5.3 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

CEILING HEIGHT, m

RESPONSE TIME INDEX
 TEMPERATURE RISE

(m*s) ^{1/2}	°C											
		1	2	4	5	6	7	9	10	12	18	24
150	5	1.40	1.43	1.57	1.64	1.72	1.79	1.95	2.03	2.18	2.62*	3.10*
	10	1.66	1.70	1.86	1.95	2.04	2.13	2.32	2.41	2.59	3.13*	3.73*
	20	2.00	2.05	2.26	2.37	2.48	2.60	2.83	2.95	3.18	3.89*	4.67*
	30	2.24	2.32	2.55	2.69	2.82	2.96	3.23	3.37	3.65	4.50*	5.46*
	40	2.45	2.53	2.80	2.95	3.11	3.26	3.57	3.73	4.06	5.05*	6.17*
	60	2.78	2.89	3.23	3.41	3.59	3.78	4.17	4.37	4.77	6.05*	7.49*
	70	2.92	3.05	3.41	3.61	3.81	4.02	4.44	4.66	5.10	6.51*	8.10*
	80	3.06	3.20	3.58	3.80	4.01	4.24	4.70	4.93	5.42	6.97*	8.70*
200	5	1.50	1.53	1.67	1.74	1.82	1.91	2.07	2.15	2.30	2.76*	3.26*
	10	1.78	1.82	1.99	2.08	2.18	2.27	2.47	2.56	2.75	3.31*	3.93*
	20	2.15	2.21	2.42	2.54	2.66	2.78	3.02	3.14	3.38	4.10*	4.91*
	30	2.42	2.50	2.75	2.88	3.02	3.16	3.45	3.59	3.87	4.74*	5.71*
	40	2.65	2.74	3.02	3.17	3.33	3.49	3.81	3.97	4.30	5.30*	6.43*
	60	3.01	3.13	3.47	3.65	3.84	4.04	4.43	4.63	5.04	6.30*	7.74*
	70	3.17	3.30	3.66	3.86	4.07	4.28	4.71	4.93	5.37	6.77*	8.36*
	80	3.31	3.45	3.85	4.06	4.29	4.51	4.97	5.21	5.69	7.22*	8.95*
250	5	1.58	1.61	1.75	1.83	1.92	2.00	2.17	2.25	2.41	2.89*	3.40*
	10	1.88	1.92	2.10	2.20	2.30	2.40	2.60	2.69	2.89	3.47*	4.10*
	20	2.28	2.34	2.56	2.69	2.81	2.93	3.18	3.31	3.56	4.29*	5.12*
	30	2.58	2.65	2.91	3.05	3.20	3.34	3.63	3.78	4.07	4.95*	5.94*
	40	2.82	2.91	3.20	3.36	3.52	3.68	4.01	4.18	4.51	5.52*	6.67*
	60	3.21	3.33	3.68	3.87	4.06	4.26	4.66	4.86	5.27	6.54*	7.99*
	70	3.38	3.51	3.88	4.09	4.30	4.51	4.95	5.17	5.62	7.01*	8.60*
	80	3.53	3.67	4.08	4.30	4.52	4.75	5.22	5.46	5.94	7.46*	9.19*
300	5	1.64	1.68	1.83	1.91	2.00	2.08	2.25	2.34	2.51	2.99*	3.53*
	10	1.97	2.02	2.20	2.30	2.40	2.50	2.71	2.81	3.01	3.60*	4.26*
	20	2.40	2.46	2.69	2.82	2.94	3.07	3.33	3.46	3.71	4.46*	5.31*
	30	2.71	2.79	3.06	3.20	3.35	3.50	3.80	3.95	4.25	5.14*	6.15*
	40	2.97	3.06	3.36	3.52	3.69	3.86	4.19	4.36	4.70	5.73*	6.89*
	60	3.38	3.50	3.86	4.06	4.25	4.46	4.86	5.07	5.49	6.76*	8.22*
	70	3.56	3.69	4.08	4.29	4.50	4.72	5.16	5.38	5.84	7.23*	8.83*
	80	3.73	3.87	4.28	4.51	4.73	4.97	5.44	5.68	6.17	7.69*	9.42*
400	5	1.77	1.80	1.96	2.05	2.14	2.23	2.41	2.50	2.67	3.18*	3.74*
	10	2.13	2.18	2.37	2.47	2.58	2.69	2.91	3.01	3.22	3.84*	4.53*
	20	2.60	2.67	2.91	3.04	3.17	3.31	3.58	3.71	3.98	4.76*	5.64*
	30	2.95	3.03	3.31	3.46	3.62	3.77	4.09	4.24	4.55	5.48*	6.52*
	40	3.23	3.32	3.64	3.81	3.98	4.16	4.51	4.69	5.04	6.09*	7.29*
	60	3.68	3.81	4.18	4.39	4.59	4.80	5.22	5.44	5.86	7.16*	8.64*
	70	3.88	4.02	4.42	4.64	4.86	5.08	5.54	5.77	6.23	7.64*	9.26*
	80	4.06	4.21	4.64	4.87	5.11	5.35	5.83	6.08	6.58	8.10*	9.86*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.5 m (RADIUS = 5.3 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s²)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m	1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}	°C												
0	5		0.98	1.05	1.25	1.36	1.47	1.58	1.80	1.91	2.13	2.81*	3.49*
	10		1.13	1.25	1.53	1.68	1.82	1.97	2.27	2.42	2.72	3.65*	4.60*
	20		1.38	1.58	2.00	2.21	2.42	2.63	3.07	3.28	3.72	5.08*	6.47*
	30		1.60	1.87	2.41	2.67	2.94	3.22	3.76	4.04	4.60	6.32*	8.12*
	40		1.80	2.14	2.78	3.10	3.43	3.75	4.40	4.73	5.40	7.47*	9.62*
	60		2.18	2.63	3.47	3.89	4.31	4.73	5.58	6.01	6.88	9.57*	12.38*
	70		2.35	2.86	3.79	4.26	4.72	5.18	6.12	6.60	7.56	10.55*	13.67*
	80		2.52	3.08	4.10	4.61	5.12	5.63	6.65	7.17	8.23	11.50*	14.92*
10	5		1.26	1.30	1.46	1.56	1.65	1.75	1.95	2.06	2.27	2.92*	3.59*
	10		1.44	1.51	1.73	1.86	1.99	2.13	2.41	2.55	2.84	3.75*	4.69*
	20		1.71	1.83	2.18	2.37	2.57	2.77	3.18	3.39	3.82	5.16*	6.55*
	30		1.92	2.11	2.57	2.82	3.08	3.34	3.87	4.14	4.69	6.40*	8.18*
	40		2.12	2.36	2.94	3.24	3.55	3.86	4.50	4.83	5.49	7.54*	9.68*
	60		2.47	2.83	3.61	4.01	4.42	4.83	5.67	6.09	6.95	9.63*	12.44*
	70		2.64	3.05	3.93	4.38	4.83	5.28	6.21	6.68	7.64	10.61*	13.73*
	80		2.80	3.27	4.24	4.73	5.22	5.72	6.74	7.25	8.30	11.55*	14.97*
20	5		1.39	1.43	1.59	1.69	1.78	1.88	2.08	2.18	2.39	3.02*	3.69*
	10		1.60	1.67	1.89	2.01	2.14	2.27	2.54	2.67	2.96	3.84*	4.78*
	20		1.91	2.02	2.34	2.52	2.70	2.90	3.30	3.50	3.92	5.23*	6.62*
	30		2.15	2.30	2.73	2.96	3.21	3.46	3.97	4.24	4.78	6.47*	8.25*
	40		2.35	2.56	3.09	3.37	3.67	3.97	4.60	4.92	5.57	7.60*	9.75*
	60		2.72	3.02	3.75	4.13	4.53	4.93	5.75	6.17	7.03	9.69*	12.49*
	70		2.89	3.24	4.06	4.49	4.93	5.38	6.30	6.76	7.71	10.67*	13.78*
	80		3.05	3.45	4.36	4.84	5.32	5.82	6.82	7.33	8.37	11.61*	15.02*
50	5		1.63	1.67	1.84	1.94	2.04	2.15	2.35	2.46	2.67	3.29*	3.97*
	10		1.91	1.97	2.19	2.32	2.45	2.58	2.84	2.98	3.25	4.10*	5.03*
	20		2.29	2.39	2.70	2.87	3.05	3.23	3.61	3.80	4.20	5.46*	6.84*
	30		2.58	2.72	3.11	3.33	3.56	3.79	4.27	4.52	5.04	6.68*	8.45*
	40		2.83	3.00	3.48	3.74	4.01	4.30	4.88	5.19	5.82	7.80*	9.93*
	60		3.25	3.50	4.13	4.49	4.85	5.23	6.02	6.42	7.25	9.87*	12.66*
	70		3.43	3.72	4.44	4.84	5.25	5.67	6.55	7.00	7.93	10.84*	13.94*
	80		3.61	3.93	4.74	5.17	5.63	6.10	7.06	7.56	8.58	11.78*	15.18*
100	5		1.87	1.92	2.10	2.21	2.32	2.43	2.65	2.76	2.98	3.63*	4.33*
	10		2.22	2.29	2.52	2.66	2.79	2.93	3.20	3.34	3.62	4.47*	5.41*
	20		2.69	2.79	3.11	3.29	3.47	3.65	4.03	4.22	4.61	5.83*	7.19*
	30		3.04	3.18	3.57	3.79	4.01	4.24	4.71	4.95	5.45	7.02*	8.77*
	40		3.34	3.50	3.97	4.22	4.49	4.76	5.32	5.61	6.21	8.12*	10.23*
	60		3.83	4.06	4.66	4.99	5.33	5.69	6.43	6.82	7.62	10.16*	12.94*
	70		4.04	4.30	4.97	5.34	5.73	6.12	6.96	7.39	8.28	11.12*	14.21*
	80		4.24	4.53	5.27	5.68	6.10	6.54	7.46	7.94	8.92	12.05*	15.43*

SPACING = 7.5 m (RADIUS = 5.3 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE (m*s) ^{1/2}	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
150	5	2.05	2.10	2.29	2.41	2.52	2.64	2.87	2.98	3.21	3.88*	4.62*
	10	2.45	2.52	2.77	2.90	3.05	3.19	3.48	3.62	3.91	4.78*	5.73*
	20	2.98	3.09	3.42	3.60	3.79	3.98	4.36	4.55	4.95	6.16*	7.52*
	30	3.38	3.52	3.92	4.14	4.37	4.60	5.07	5.31	5.80	7.35*	9.09*
	40	3.71	3.88	4.35	4.60	4.87	5.14	5.70	5.98	6.57	8.44*	10.53*
	60	4.26	4.48	5.08	5.41	5.74	6.09	6.82	7.19	7.97	10.45*	13.21*
	70	4.49	4.74	5.41	5.77	6.14	6.53	7.34	7.76	8.62	11.40*	14.47*
	80	4.71	4.99	5.72	6.11	6.53	6.95	7.84	8.30	9.26	12.32*	15.69*
200	5	2.19	2.24	2.45	2.56	2.68	2.80	3.04	3.16	3.40	4.09*	4.85*
	10	2.63	2.70	2.96	3.11	3.26	3.40	3.70	3.85	4.15	5.03*	6.02*
	20	3.22	3.33	3.67	3.86	4.05	4.24	4.64	4.84	5.24	6.46*	7.83*
	30	3.66	3.79	4.21	4.43	4.66	4.90	5.38	5.62	6.11	7.65*	9.39*
	40	4.01	4.18	4.66	4.92	5.19	5.46	6.02	6.31	6.89	8.74*	10.83*
	60	4.61	4.83	5.43	5.76	6.10	6.45	7.17	7.54	8.30	10.74*	13.48*
	70	4.86	5.11	5.77	6.14	6.51	6.89	7.69	8.10	8.95	11.68*	14.73*
	80	5.10	5.37	6.10	6.49	6.90	7.32	8.19	8.65	9.58	12.60*	15.95*
250	5	2.31	2.36	2.58	2.70	2.82	2.95	3.20	3.32	3.56	4.28*	5.06*
	10	2.79	2.86	3.13	3.28	3.43	3.59	3.90	4.05	4.35	5.26*	6.27*
	20	3.42	3.53	3.89	4.08	4.28	4.48	4.88	5.08	5.49	6.72*	8.12*
	30	3.89	4.03	4.45	4.69	4.92	5.16	5.65	5.90	6.39	7.93*	9.68*
	40	4.27	4.44	4.93	5.20	5.47	5.75	6.32	6.60	7.19	9.02*	11.11*
	60	4.91	5.13	5.74	6.07	6.41	6.76	7.48	7.85	8.61	11.02*	13.75*
	70	5.18	5.43	6.10	6.46	6.84	7.22	8.01	8.42	9.26	11.96*	14.99*
	80	5.43	5.70	6.43	6.83	7.24	7.65	8.52	8.97	9.89	12.86*	16.20*
300	5	2.42	2.47	2.70	2.82	2.95	3.08	3.33	3.46	3.71	4.44*	5.25*
	10	2.93	3.00	3.28	3.44	3.59	3.75	4.07	4.22	4.54	5.46*	6.50*
	20	3.60	3.71	4.08	4.28	4.48	4.68	5.10	5.30	5.72	6.97*	8.38*
	30	4.10	4.24	4.67	4.91	5.15	5.40	5.89	6.14	6.65	8.19*	9.95*
	40	4.50	4.67	5.17	5.45	5.72	6.01	6.58	6.87	7.46	9.29*	11.39*
	60	5.17	5.40	6.02	6.35	6.70	7.05	7.77	8.14	8.90	11.29*	14.01*
	70	5.46	5.71	6.39	6.75	7.13	7.52	8.31	8.72	9.56	12.22*	15.25*
	80	5.73	6.00	6.73	7.13	7.54	7.96	8.83	9.27	10.19	13.12*	16.45*
400	5	2.60	2.66	2.90	3.03	3.16	3.30	3.56	3.70	3.96	4.72*	5.57*
	10	3.17	3.25	3.54	3.70	3.87	4.03	4.37	4.53	4.86	5.82*	6.90*
	20	3.91	4.03	4.41	4.62	4.83	5.04	5.47	5.69	6.12	7.40*	8.85*
	30	4.46	4.60	5.06	5.30	5.56	5.81	6.32	6.58	7.10	8.67*	10.46*
	40	4.90	5.08	5.60	5.88	6.17	6.46	7.05	7.34	7.95	9.79*	11.90*
	60	5.63	5.86	6.50	6.84	7.20	7.56	8.29	8.66	9.42	11.80*	14.53*
	70	5.95	6.20	6.89	7.27	7.65	8.05	8.85	9.26	10.10	12.73*	15.75*
	80	6.24	6.51	7.26	7.67	8.08	8.51	9.38	9.82	10.74	13.63*	16.94*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.5 m (RADIUS = 5.3 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE	CEILING HEIGHT, m											
			1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	°C													
	5	1.44	1.58	1.93	2.11	2.29	2.47	2.84	3.03	3.40	4.55*	5.72*		
	10	1.74	1.98	2.48	2.74	3.00	3.26	3.79	4.06	4.59	6.24*	7.94*		
	20	2.24	2.64	3.42	3.81	4.20	4.59	5.38	5.78	6.59	9.09*	11.69*		
	30	2.69	3.22	4.24	4.74	5.25	5.75	6.78	7.29	8.34	11.58*	14.97*		
	40	3.10	3.76	4.99	5.60	6.21	6.82	8.06	8.68	9.95	13.88*	17.98*		
	60	3.84	4.74	6.37	7.17	7.97	8.78	10.40	11.23	12.89	18.07*	23.50*		
	70	4.19	5.19	7.01	7.90	8.80	9.69	11.50	12.41	14.27	20.04*	26.08*		
10	80	4.53	5.63	7.64	8.61	9.59	10.57	12.56	13.56	15.60	21.93*	28.57*		
	5	1.81	1.89	2.17	2.33	2.49	2.66	3.01	3.18	3.54	4.66*	5.82*		
	10	2.13	2.28	2.70	2.93	3.17	3.42	3.93	4.19	4.71	6.33*	8.03*		
	20	2.62	2.91	3.60	3.97	4.34	4.72	5.50	5.89	6.69	9.17*	11.76*		
	30	3.04	3.47	4.41	4.89	5.38	5.87	6.88	7.39	8.43	11.66*	15.03*		
	40	3.43	3.98	5.15	5.74	6.33	6.93	8.15	8.77	10.03	13.94*	18.04*		
	60	4.15	4.94	6.51	7.29	8.08	8.88	10.49	11.31	12.97	18.13*	23.56*		
	70	4.48	5.39	7.15	8.02	8.90	9.79	11.58	12.49	14.34	20.09*	26.14*		
20	80	4.81	5.83	7.77	8.73	9.69	10.67	12.64	13.64	15.67	21.99*	28.62*		
	5	2.01	2.08	2.35	2.50	2.66	2.82	3.16	3.33	3.68	4.77*	5.92*		
	10	2.37	2.50	2.89	3.11	3.34	3.57	4.06	4.31	4.83	6.43*	8.12*		
	20	2.90	3.14	3.78	4.13	4.49	4.86	5.61	6.00	6.79	9.25*	11.83*		
	30	3.33	3.70	4.57	5.03	5.51	5.99	6.99	7.49	8.52	11.73*	15.10*		
	40	3.72	4.20	5.30	5.87	6.45	7.05	8.25	8.87	10.12	14.01*	18.11*		
	60	4.43	5.14	6.65	7.42	8.19	8.98	10.58	11.39	13.04	18.19*	23.61*		
	70	4.77	5.59	7.28	8.14	9.01	9.89	11.67	12.58	14.42	20.15*	26.19*		
50	80	5.09	6.02	7.90	8.84	9.80	10.76	12.72	13.72	15.74	22.04*	28.67*		
	5	2.37	2.44	2.72	2.87	3.03	3.19	3.52	3.69	4.03	5.08*	6.22*		
	10	2.82	2.94	3.32	3.53	3.75	3.97	4.44	4.68	5.16	6.70*	8.37*		
	20	3.46	3.67	4.25	4.56	4.90	5.24	5.95	6.32	7.08	9.48*	12.05*		
	30	3.96	4.26	5.03	5.45	5.89	6.35	7.30	7.79	8.79	11.94*	15.30*		
	40	4.39	4.78	5.74	6.27	6.82	7.38	8.54	9.14	10.36	14.21*	18.29*		
	60	5.14	5.71	7.06	7.78	8.52	9.28	10.84	11.64	13.27	18.37*	23.78*		
	70	5.48	6.14	7.68	8.49	9.33	10.18	11.92	12.82	14.63	20.32*	26.35*		
100	80	5.80	6.56	8.28	9.18	10.11	11.05	12.97	13.95	15.95	22.21*	28.83*		
	5	2.74	2.82	3.11	3.28	3.44	3.61	3.95	4.13	4.47	5.52*	6.68*		
	10	3.30	3.42	3.81	4.03	4.25	4.47	4.93	5.17	5.65	7.14*	8.79*		
	20	4.07	4.27	4.83	5.14	5.46	5.79	6.47	6.82	7.55	9.86*	12.41*		
	30	4.65	4.92	5.65	6.05	6.47	6.90	7.80	8.26	9.22	12.29*	15.63*		
	40	5.14	5.49	6.38	6.87	7.38	7.91	9.02	9.59	10.77	14.54*	18.60*		
	60	5.98	6.47	7.69	8.36	9.06	9.78	11.28	12.05	13.64	18.67*	24.06*		
	70	6.35	6.92	8.31	9.06	9.85	10.66	12.34	13.21	14.99	20.61*	26.62*		
80	6.70	7.35	8.90	9.74	10.61	11.51	13.38	14.33	16.30	22.49*	29.09*			

SPACING = 7.5 m (RADIUS = 5.3 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	3.01	3.09	3.40	3.57	3.75	3.92	4.28	4.46	4.81	5.88*	7.06*
	10	3.65	3.77	4.18	4.40	4.63	4.86	5.33	5.57	6.05	7.53*	9.19*
	20	4.51	4.71	5.28	5.59	5.91	6.24	6.92	7.26	7.98	10.24*	12.77*
	30	5.16	5.42	6.15	6.54	6.95	7.38	8.25	8.71	9.64	12.64*	15.95*
	40	5.70	6.04	6.91	7.39	7.88	8.40	9.47	10.03	11.17	14.86*	18.90*
	60	6.62	7.08	8.25	8.89	9.56	10.26	11.71	12.46	14.01	18.97*	24.34*
	70	7.02	7.55	8.87	9.59	10.34	11.13	12.76	13.61	15.35	20.90*	26.88*
	80	7.39	7.99	9.46	10.26	11.10	11.97	13.78	14.72	16.64	22.76*	29.35*
200	5	3.23	3.31	3.63	3.81	3.99	4.18	4.55	4.73	5.10	6.19*	7.40*
	10	3.93	4.06	4.47	4.70	4.94	5.18	5.66	5.90	6.39	7.88*	9.55*
	20	4.87	5.07	5.65	5.97	6.29	6.63	7.31	7.65	8.36	10.60*	13.12*
	30	5.58	5.84	6.57	6.97	7.38	7.80	8.67	9.11	10.03	12.98*	16.28*
	40	6.16	6.49	7.36	7.84	8.33	8.84	9.89	10.43	11.56	15.18*	19.20*
	60	7.14	7.59	8.74	9.37	10.03	10.70	12.12	12.85	14.38	19.26*	24.61*
	70	7.57	8.08	9.37	10.08	10.81	11.57	13.16	13.99	15.70	21.18*	27.15*
	80	7.97	8.55	9.97	10.75	11.56	12.41	14.17	15.09	16.99	23.04*	29.60*
250	5	3.41	3.50	3.84	4.02	4.21	4.40	4.78	4.97	5.34	6.46*	7.70*
	10	4.17	4.30	4.73	4.97	5.21	5.45	5.95	6.19	6.69	8.20*	9.89*
	20	5.18	5.38	5.97	6.30	6.63	6.97	7.65	8.00	8.71	10.94*	13.46*
	30	5.93	6.20	6.94	7.34	7.75	8.17	9.04	9.49	10.40	13.31*	16.59*
	40	6.56	6.88	7.76	8.24	8.73	9.23	10.28	10.82	11.93	15.50*	19.50*
	60	7.59	8.04	9.18	9.80	10.45	11.12	12.51	13.23	14.73	19.55*	24.88*
	70	8.05	8.55	9.82	10.52	11.24	11.99	13.55	14.37	16.05	21.46*	27.41*
	80	8.47	9.03	10.43	11.20	12.00	12.83	14.56	15.46	17.33	23.31*	29.86*
300	5	3.58	3.67	4.01	4.20	4.40	4.59	4.98	5.17	5.56	6.70*	7.97*
	10	4.38	4.52	4.96	5.20	5.45	5.70	6.20	6.46	6.96	8.49*	10.21*
	20	5.46	5.66	6.26	6.59	6.93	7.27	7.97	8.32	9.04	11.26*	13.78*
	30	6.25	6.52	7.26	7.67	8.09	8.51	9.39	9.83	10.74	13.63*	16.91*
	40	6.91	7.23	8.12	8.60	9.09	9.60	10.64	11.18	12.28	15.81*	19.80*
	60	8.00	8.44	9.58	10.20	10.84	11.51	12.89	13.60	15.08	19.84*	25.16*
	70	8.47	8.97	10.24	10.93	11.64	12.38	13.93	14.73	16.39	21.74*	27.68*
	80	8.91	9.47	10.86	11.62	12.41	13.22	14.93	15.82	17.66	23.58*	30.12*
400	5	3.86	3.96	4.32	4.52	4.72	4.93	5.34	5.54	5.94	7.12*	8.44*
	10	4.75	4.89	5.35	5.61	5.87	6.13	6.65	6.91	7.44	9.00*	10.77*
	20	5.93	6.14	6.77	7.11	7.46	7.81	8.52	8.88	9.61	11.85*	14.40*
	30	6.80	7.07	7.84	8.26	8.68	9.12	10.00	10.45	11.37	14.24*	17.52*
	40	7.51	7.84	8.74	9.23	9.74	10.25	11.30	11.83	12.93	16.41*	20.39*
	60	8.70	9.14	10.29	10.91	11.55	12.21	13.58	14.29	15.74	20.42*	25.70*
	70	9.21	9.70	10.97	11.66	12.38	13.11	14.63	15.42	17.05	22.30*	28.20*
	80	9.68	10.23	11.62	12.37	13.16	13.96	15.64	16.51	18.31	24.13*	30.63*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.5 m (RADIUS = 5.3 m)
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s)^{1/2}

°C

1

2

4

5

6

7

9

10

12

18

24

0

5

10

20

30

40

60

70

80

2.20

2.80

3.81

4.70

5.52

7.01

7.71

8.38

10.58

14.51

13.27

11.98

9.23

6.83

5.76

4.60

3.27

2.48

3.10

3.41

3.73

4.05

4.70

5.02

5.68

7.69*

9.76*

11.08*

14.22*

16.77*

21.70*

28.27*

34.30*

45.34*

50.50*

55.47*

10

5

10

20

30

40

60

70

80

2.66

3.24

4.21

5.06

5.85

7.31

8.00

8.67

10.78

14.64

13.41

12.12

9.38

7.89

6.27

4.43

3.35

3.64

3.94

4.24

4.86

5.18

5.82

7.80*

9.87*

11.17*

14.30*

16.85*

21.78*

28.33*

34.36*

45.39*

50.55*

55.53*

20

5

10

20

30

40

60

70

80

2.94

3.58

4.56

5.40

6.18

7.62

8.29

8.95

10.97

14.77

13.54

12.26

9.54

8.05

6.45

4.64

3.58

3.85

4.13

4.42

5.02

5.33

5.96

7.91*

9.97*

11.26*

14.39*

16.93*

21.85*

28.40*

34.42*

45.45*

50.60*

55.58*

50

5

10

20

30

40

60

70

80

3.49

4.25

5.35

6.24

7.03

8.46

9.12

9.76

11.54

15.16

13.94

12.68

9.99

8.54

6.97

5.19

4.50

3.63

4.10

4.36

4.62

4.90

5.47

5.76

6.36

8.24*

10.28*

11.54*

14.65*

17.16*

22.07*

28.60*

34.60*

45.61*

50.76*

55.73*

100

5

10

20

30

40

60

70

80

4.05

4.97

6.24

7.24

8.10

9.60

10.28

10.93

12.44

14.60

13.36

10.74

8.87

7.83

6.66

5.20

4.20

4.68

4.94

5.21

5.49

6.06

6.35

6.93

8.76*

10.78*

12.00*

15.08*

17.55*

22.43*

28.93*

34.91*

45.89*

51.03*

55.99*

SPACING = 7.5 m (RADIUS = 5.3 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 (m*s) ^{1/2}	5	4.47	4.62	5.11	5.38	5.66	5.95	6.53	6.82	7.41	9.22*	11.25*	
	10	5.49	5.73	6.42	6.80	7.19	7.59	8.42	8.84	9.70	12.44*	15.50*	
	20	6.91	7.31	8.36	8.94	9.54	10.16	11.45	12.12	13.51	17.94*	22.80*	
	30	8.00	8.55	9.96	10.73	11.53	12.37	14.11	15.01	16.88	22.83*	29.26*	
	40	8.92	9.64	11.40	12.36	13.36	14.40	16.58	17.70	20.01	27.34*	35.22*	
	60	10.51	11.55	14.01	15.35	16.74	18.17	21.14	22.66	25.78	35.64*	46.17*	
	70	11.23	12.43	15.24	16.76	18.33	19.95	23.28	24.99	28.49	39.53*	51.30*	
	80	11.90	13.27	16.43	18.13	19.87	21.66	25.36	27.25	31.12	43.29*	56.25*	
200	5	4.80	4.95	5.47	5.75	6.04	6.33	6.92	7.22	7.82	9.64*	11.68*	
	10	5.92	6.16	6.87	7.25	7.65	8.05	8.88	9.30	10.16	12.87*	15.92*	
	20	7.46	7.85	8.90	9.47	10.07	10.68	11.95	12.61	13.96	18.32*	23.16*	
	30	8.62	9.16	10.54	11.30	12.08	12.90	14.60	15.48	17.31	23.17*	29.59*	
	40	9.61	10.29	12.00	12.94	13.91	14.93	17.05	18.15	20.42	27.67*	35.53*	
	60	11.28	12.27	14.63	15.92	17.27	18.66	21.57	23.07	26.16	35.94*	46.45*	
	70	12.03	13.16	15.85	17.32	18.85	20.42	23.70	25.39	28.85	39.82*	51.57*	
	80	12.73	14.01	17.04	18.67	20.38	22.13	25.76	27.63	31.46	43.57*	56.51*	
250	5	5.09	5.25	5.77	6.06	6.36	6.66	7.26	7.56	8.17	10.02*	12.08*	
	10	6.29	6.53	7.25	7.64	8.05	8.46	9.29	9.72	10.58	13.27*	16.32*	
	20	7.93	8.32	9.37	9.95	10.54	11.15	12.41	13.06	14.40	18.70*	23.51*	
	30	9.16	9.69	11.06	11.81	12.59	13.39	15.07	15.94	17.74	23.52*	29.91*	
	40	10.20	10.87	12.55	13.47	14.43	15.43	17.50	18.58	20.82	27.99*	35.83*	
	60	11.95	12.90	15.21	16.47	17.78	19.15	22.00	23.48	26.53	36.23*	46.73*	
	70	12.73	13.82	16.43	17.86	19.35	20.89	24.11	25.78	29.21	40.10*	51.83*	
	80	13.46	14.69	17.61	19.21	20.87	22.59	26.17	28.01	31.81	43.84*	56.77*	
300	5	5.34	5.50	6.04	6.34	6.64	6.95	7.57	7.88	8.50	10.36*	12.46*	
	10	6.62	6.86	7.59	7.99	8.40	8.82	9.67	10.09	10.96	13.66*	16.71*	
	20	8.34	8.73	9.80	10.38	10.97	11.58	12.84	13.49	14.82	19.07*	23.87*	
	30	9.64	10.17	11.54	12.29	13.06	13.86	15.51	16.37	18.15	23.87*	30.24*	
	40	10.73	11.39	13.06	13.97	14.92	15.90	17.95	19.01	21.22	28.32*	36.13*	
	60	12.55	13.48	15.75	16.98	18.28	19.61	22.42	23.88	26.89	36.53*	47.00*	
	70	13.36	14.42	16.98	18.38	19.84	21.36	24.53	26.17	29.57	40.39*	52.10*	
	80	14.11	15.31	18.16	19.72	21.35	23.04	26.57	28.39	32.16	44.12*	57.03*	
400	5	5.78	5.95	6.51	6.82	7.14	7.46	8.10	8.42	9.06	10.98*	13.13*	
	10	7.18	7.43	8.19	8.61	9.03	9.46	10.33	10.76	11.65	14.36*	17.44*	
	20	9.07	9.46	10.54	11.13	11.74	12.36	13.62	14.27	15.60	19.79*	24.57*	
	30	10.47	11.00	12.38	13.13	13.90	14.70	16.34	17.19	18.94	24.55*	30.88*	
	40	11.65	12.30	13.96	14.87	15.81	16.77	18.79	19.83	21.99	28.96*	36.74*	
	60	13.60	14.50	16.73	17.94	19.20	20.51	23.24	24.67	27.62	37.12*	47.55*	
	70	14.46	15.48	17.98	19.35	20.77	22.24	25.33	26.94	30.27	40.96*	52.63*	
	80	15.26	16.41	19.18	20.70	22.28	23.92	27.36	29.15	32.84	44.67*	57.54*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 m (RADIUS = 5.7 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m	1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}	°C												
0	5		0.72	0.76	0.88	0.94	1.01	1.08	1.22	1.28	1.42	1.84	2.26*
	10		0.80	0.86	1.02	1.11	1.19	1.28	1.46	1.55	1.73	2.27	2.82*
	20		0.93	1.04	1.27	1.39	1.51	1.63	1.87	1.99	2.24	3.00	3.77*
	30		1.05	1.19	1.48	1.63	1.78	1.93	2.23	2.38	2.69	3.64	4.61*
	40		1.16	1.33	1.68	1.85	2.03	2.20	2.56	2.74	3.10	4.22	5.38*
	60		1.36	1.59	2.04	2.26	2.49	2.71	3.17	3.40	3.86	5.29	6.78*
	70		1.45	1.71	2.21	2.45	2.70	2.95	3.45	3.70	4.22	5.80	7.44*
	80		1.54	1.82	2.37	2.64	2.91	3.18	3.72	4.00	4.56	6.28	8.07*
10	5		0.94	0.95	1.05	1.11	1.17	1.23	1.36	1.43	1.55	1.95	2.36*
	10		1.05	1.08	1.21	1.28	1.35	1.43	1.59	1.68	1.85	2.37	2.91*
	20		1.21	1.26	1.44	1.54	1.65	1.76	1.99	2.10	2.34	3.08	3.85*
	30		1.33	1.41	1.65	1.78	1.91	2.05	2.34	2.48	2.78	3.71	4.68*
	40		1.44	1.55	1.83	1.99	2.15	2.32	2.66	2.84	3.19	4.29	5.44*
	60		1.64	1.79	2.18	2.39	2.60	2.82	3.26	3.48	3.94	5.36	6.84*
	70		1.73	1.91	2.34	2.57	2.81	3.05	3.54	3.79	4.29	5.85	7.49*
	80		1.81	2.02	2.50	2.76	3.01	3.27	3.81	4.08	4.63	6.34	8.12*
20	5		1.03	1.04	1.15	1.21	1.27	1.33	1.46	1.52	1.65	2.05	2.45*
	10		1.16	1.19	1.32	1.39	1.47	1.55	1.71	1.79	1.95	2.46	2.99*
	20		1.35	1.40	1.57	1.67	1.77	1.88	2.10	2.21	2.44	3.16	3.92*
	30		1.50	1.57	1.78	1.91	2.03	2.17	2.44	2.58	2.87	3.78	4.74*
	40		1.62	1.71	1.97	2.12	2.27	2.43	2.76	2.93	3.27	4.36	5.50*
	60		1.83	1.96	2.31	2.51	2.71	2.92	3.35	3.57	4.01	5.42	6.89*
	70		1.93	2.08	2.47	2.69	2.92	3.15	3.62	3.87	4.36	5.91	7.55*
	80		2.02	2.19	2.63	2.87	3.12	3.37	3.89	4.16	4.70	6.39	8.18*
50	5		1.19	1.21	1.32	1.38	1.45	1.52	1.65	1.72	1.86	2.26	2.68*
	10		1.37	1.40	1.54	1.61	1.69	1.77	1.94	2.02	2.19	2.69	3.23*
	20		1.62	1.67	1.84	1.94	2.04	2.15	2.36	2.47	2.69	3.38	4.13*
	30		1.80	1.87	2.08	2.20	2.32	2.45	2.71	2.85	3.12	3.99	4.94*
	40		1.96	2.04	2.29	2.43	2.57	2.72	3.03	3.19	3.52	4.56	5.68*
	60		2.21	2.33	2.65	2.83	3.01	3.20	3.61	3.81	4.24	5.60	7.06*
	70		2.33	2.45	2.81	3.01	3.22	3.43	3.88	4.11	4.58	6.09	7.71*
	80		2.43	2.57	2.97	3.18	3.41	3.65	4.14	4.39	4.91	6.56	8.33*
100	5		1.35	1.38	1.50	1.57	1.64	1.71	1.85	1.93	2.07	2.50	2.94*
	10		1.59	1.62	1.76	1.85	1.93	2.02	2.19	2.28	2.46	2.98	3.53*
	20		1.89	1.94	2.13	2.24	2.34	2.45	2.68	2.79	3.01	3.70	4.45*
	30		2.12	2.19	2.41	2.53	2.66	2.79	3.06	3.19	3.47	4.31	5.25*
	40		2.31	2.39	2.64	2.79	2.93	3.08	3.39	3.55	3.87	4.87	5.98*
	60		2.62	2.73	3.05	3.22	3.41	3.59	3.98	4.18	4.59	5.89	7.33*
	70		2.75	2.87	3.22	3.42	3.62	3.82	4.24	4.47	4.92	6.37	7.97*
	80		2.88	3.01	3.39	3.60	3.82	4.04	4.51	4.75	5.25	6.84	8.59*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 m (RADIUS = 5.7 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TEMPERATURE

TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	1.47	1.50	1.62	1.70	1.77	1.85	2.00	2.08	2.23	2.67	3.14*
	10	1.74	1.77	1.93	2.02	2.11	2.20	2.38	2.47	2.66	3.20	3.77*
	20	2.09	2.14	2.34	2.45	2.56	2.68	2.91	3.03	3.26	3.96	4.73*
	30	2.35	2.42	2.65	2.78	2.91	3.05	3.32	3.46	3.74	4.59	5.53*
	40	2.57	2.65	2.91	3.06	3.21	3.36	3.68	3.83	4.16	5.15	6.26*
	60	2.92	3.02	3.35	3.53	3.71	3.90	4.29	4.49	4.89	6.17	7.60*
	70	3.07	3.19	3.54	3.74	3.94	4.14	4.57	4.79	5.23	6.65	8.23*
	80	3.20	3.34	3.72	3.93	4.15	4.37	4.83	5.07	5.56	7.11	8.84*
200	5	1.57	1.60	1.73	1.80	1.88	1.96	2.12	2.20	2.36	2.82	3.30*
	10	1.86	1.90	2.06	2.15	2.25	2.34	2.53	2.63	2.82	3.38	3.98*
	20	2.25	2.31	2.51	2.63	2.75	2.86	3.11	3.23	3.47	4.19	4.97*
	30	2.54	2.61	2.85	2.98	3.12	3.26	3.54	3.68	3.97	4.84	5.79*
	40	2.77	2.86	3.13	3.28	3.44	3.60	3.92	4.08	4.40	5.41	6.52*
	60	3.16	3.26	3.60	3.78	3.97	4.16	4.56	4.76	5.16	6.44	7.85*
	70	3.32	3.44	3.80	4.00	4.21	4.42	4.85	5.06	5.51	6.91	8.48*
	80	3.47	3.60	3.99	4.21	4.43	4.66	5.12	5.35	5.84	7.37	9.08*
250	5	1.65	1.68	1.82	1.90	1.98	2.06	2.22	2.31	2.47	2.94	3.44*
	10	1.97	2.01	2.18	2.27	2.37	2.47	2.67	2.77	2.96	3.54	4.15*
	20	2.39	2.45	2.66	2.78	2.90	3.02	3.27	3.40	3.64	4.38	5.18*
	30	2.70	2.77	3.02	3.16	3.30	3.44	3.73	3.88	4.17	5.05	6.02*
	40	2.95	3.03	3.32	3.47	3.63	3.80	4.12	4.29	4.62	5.64	6.76*
	60	3.36	3.47	3.81	4.00	4.20	4.39	4.79	4.99	5.40	6.68	8.10*
	70	3.54	3.66	4.03	4.23	4.44	4.66	5.09	5.31	5.76	7.16	8.72*
	80	3.70	3.83	4.23	4.45	4.67	4.90	5.37	5.61	6.09	7.62	9.32*
300	5	1.73	1.75	1.90	1.98	2.06	2.15	2.32	2.40	2.57	3.05	3.57*
	10	2.07	2.11	2.28	2.38	2.48	2.58	2.78	2.88	3.09	3.68	4.31*
	20	2.51	2.57	2.79	2.91	3.04	3.17	3.42	3.55	3.80	4.56	5.38*
	30	2.84	2.91	3.17	3.31	3.46	3.61	3.90	4.05	4.35	5.25	6.23*
	40	3.11	3.19	3.48	3.65	3.81	3.98	4.31	4.48	4.82	5.85	6.98*
	60	3.54	3.65	4.01	4.20	4.40	4.60	5.00	5.21	5.62	6.90	8.33*
	70	3.73	3.85	4.23	4.44	4.65	4.87	5.31	5.53	5.98	7.39	8.96*
	80	3.90	4.04	4.44	4.67	4.89	5.13	5.60	5.84	6.33	7.85	9.56*
400	5	1.85	1.88	2.03	2.12	2.21	2.29	2.47	2.56	2.74	3.24	3.78*
	10	2.23	2.27	2.45	2.56	2.66	2.77	2.98	3.09	3.30	3.92	4.58*
	20	2.72	2.78	3.02	3.15	3.28	3.41	3.68	3.81	4.08	4.86	5.71*
	30	3.09	3.16	3.43	3.58	3.73	3.89	4.20	4.36	4.67	5.59	6.61*
	40	3.38	3.47	3.77	3.94	4.11	4.29	4.64	4.81	5.16	6.22	7.39*
	60	3.86	3.97	4.34	4.54	4.75	4.95	5.37	5.59	6.01	7.31	8.76*
	70	4.06	4.19	4.58	4.80	5.02	5.24	5.70	5.93	6.39	7.80	9.39*
	80	4.25	4.39	4.81	5.04	5.28	5.52	6.00	6.25	6.74	8.28	9.99*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 m (RADIUS = 5.7 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

CEILING HEIGHT, m

RESPONSE
 TIME INDEX

TEMPERATURE
 RISE

(m*s)^{1/2}

°C

1

2

4

5

6

7

9

10

12

18

24

0

5

10

20

30

40

60

70

80

1.03

1.19

1.46

1.69

1.91

2.31

2.49

2.67

1.30

1.59

2.08

2.51

3.05

3.62

3.96

4.29

1.41

1.74

2.29

2.78

3.23

4.05

4.43

4.80

1.52

1.89

2.51

3.05

3.68

4.47

4.90

1.63

2.04

2.72

3.33

3.88

4.54

5.75

6.32

6.86

1.85

2.34

3.16

3.88

4.87

6.18

7.06

7.77

10.77

11.74

2.18

2.79

3.82

5.55

7.06

8.45

2.97

3.82

5.26

6.53

7.69

9.85

12.65

13.96

15.23

2.45

3.03

4.02

5.34

6.60

7.76

3.08

3.91

5.34

6.73

8.38

9.91

12.71

14.01

15.28

2.24

2.74

3.60

4.36

5.06

6.35

7.21

7.92

8.59

2.52

3.36

4.18

5.57

6.81

7.96

10.07

12.87

14.18

15.43

3.75

4.85

6.73

8.38

9.91

12.71

14.01

15.28

2.24

2.74

3.60

4.36

5.06

6.35

7.21

7.92

8.59

2.52

3.36

4.18

5.57

6.81

7.96

10.07

12.87

14.18

15.43

3.75

4.85

6.73

8.38

9.91

12.71

14.01

15.28

2.24

2.74

3.60

4.36

5.06

6.35

7.21

7.92

8.59

2.52

3.36

4.18

5.57

6.81

7.96

10.07

12.87

14.18

15.43

3.75

4.85

6.73

8.38

9.91

12.71

14.01

15.28

2.24

2.74

3.60

4.36

5.06

6.35

7.21

7.92

8.59

2.52

3.36

4.18

5.57

6.81

7.96

10.07

12.87

14.18

15.43

3.75

4.85

6.73

8.38

9.91

12.71

14.01

15.28

2.24

2.74

3.60

4.36

5.06

6.35

7.21

7.92

8.59

2.52

3.36

4.18

5.57

6.81

7.96

10.07

12.87

14.18

15.43

3.75

4.85

6.73

8.38

9.91

12.71

14.01

15.28

2.24

2.74

3.60

4.36

5.06

6.35

7.21

7.92

8.59

2.52

3.36

4.18

5.57

6.81

7.96

10.07

12.87

14.18

15.43

3.75

4.85

6.73

8.38

9.91

12.71

14.01

15.28

2.24

2.74

3.60

4.36

5.06

6.35

7.21

7.92

8.59

2.52

3.36

4.18

5.57

6.81

7.96

10.07

12.87

14.18

15.43

3.75

4.85

6.73

8.38

9.91

12.71

14.01

15.28

2.24

2.74

3.60

4.36

5.06

6.35

7.21

7.92

8.59

2.52

3.36

4.18

5.57

6.81

7.96

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 m (RADIUS = 5.7 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	2.15	2.19	2.38	2.49	2.60	2.72	2.94	3.06	3.29	3.96	4.67*
	10	2.57	2.63	2.87	3.01	3.15	3.29	3.57	3.72	4.00	4.87	5.81*
	20	3.13	3.22	3.55	3.73	3.91	4.10	4.48	4.68	5.07	6.29	7.63*
	30	3.55	3.67	4.07	4.29	4.51	4.74	5.21	5.46	5.95	7.50	9.22*
	40	3.89	4.05	4.51	4.77	5.03	5.30	5.86	6.15	6.74	8.61	10.70*
	60	4.46	4.68	5.27	5.60	5.94	6.29	7.02	7.40	8.18	10.67	13.42*
	70	4.71	4.96	5.62	5.98	6.36	6.75	7.56	7.98	8.85	11.65	14.71*
	80	4.94	5.22	5.94	6.34	6.75	7.18	8.08	8.54	9.50	12.59	15.95*
200	5	2.30	2.34	2.54	2.65	2.77	2.89	3.13	3.24	3.48	4.17	4.91*
	10	2.76	2.82	3.07	3.22	3.36	3.51	3.80	3.95	4.25	5.14	6.10*
	20	3.38	3.47	3.81	3.99	4.18	4.38	4.77	4.97	5.36	6.59	7.94*
	30	3.83	3.96	4.37	4.59	4.82	5.05	5.53	5.77	6.27	7.81	9.53*
	40	4.21	4.36	4.84	5.10	5.36	5.64	6.20	6.48	7.07	8.92	10.99*
	60	4.83	5.04	5.64	5.97	6.31	6.66	7.38	7.75	8.51	10.97	13.69*
	70	5.10	5.34	6.00	6.36	6.73	7.12	7.92	8.33	9.19	11.97	14.97*
	80	5.34	5.61	6.33	6.73	7.14	7.56	8.44	8.89	9.83	12.86	16.20*
250	5	2.42	2.47	2.68	2.79	2.92	3.04	3.28	3.40	3.65	4.36	5.12*
	10	2.92	2.99	3.25	3.40	3.55	3.70	4.00	4.16	4.46	5.37	6.35*
	20	3.59	3.69	4.03	4.22	4.42	4.62	5.02	5.22	5.62	6.86	8.23*
	30	4.08	4.21	4.62	4.85	5.09	5.32	5.81	6.06	6.55	8.10	9.82*
	40	4.48	4.64	5.12	5.38	5.65	5.93	6.50	6.79	7.37	9.21	11.27*
	60	5.14	5.35	5.96	6.29	6.63	6.98	7.70	8.07	8.83	11.25	13.96*
	70	5.43	5.67	6.33	6.69	7.07	7.45	8.25	8.66	9.50	12.21	15.23*
	80	5.69	5.96	6.68	7.08	7.48	7.90	8.77	9.22	10.15	13.14	16.45*
300	5	2.54	2.58	2.80	2.92	3.04	3.17	3.42	3.55	3.80	4.53	5.31*
	10	3.07	3.14	3.41	3.56	3.71	3.87	4.18	4.34	4.65	5.57	6.58*
	20	3.78	3.88	4.23	4.43	4.63	4.83	5.24	5.45	5.86	7.11	8.49*
	30	4.29	4.43	4.85	5.08	5.32	5.57	6.06	6.31	6.81	8.37	10.09*
	40	4.72	4.88	5.37	5.64	5.92	6.20	6.77	7.06	7.65	9.49	11.55*
	60	5.42	5.63	6.24	6.58	6.92	7.28	8.00	8.37	9.13	11.53	14.23*
	70	5.72	5.96	6.63	7.00	7.37	7.76	8.56	8.96	9.80	12.48	15.49*
	80	6.00	6.26	6.99	7.39	7.80	8.22	9.09	9.53	10.45	13.40	16.71*
400	5	2.73	2.78	3.00	3.13	3.26	3.40	3.66	3.79	4.05	4.82	5.64*
	10	3.32	3.39	3.67	3.83	3.99	4.16	4.49	4.65	4.98	5.94	6.98*
	20	4.10	4.20	4.57	4.78	4.99	5.20	5.63	5.84	6.27	7.55	8.97*
	30	4.67	4.80	5.25	5.49	5.74	5.99	6.50	6.76	7.28	8.85	10.60*
	40	5.14	5.30	5.81	6.09	6.37	6.66	7.25	7.55	8.15	10.00	12.07*
	60	5.90	6.12	6.74	7.09	7.44	7.80	8.53	8.90	9.66	12.05	14.74*
	70	6.23	6.47	7.15	7.53	7.91	8.30	9.11	9.52	10.35	13.00	15.99*
	80	6.53	6.80	7.54	7.94	8.36	8.78	9.65	10.10	11.01	13.92	17.20*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 m (RADIUS = 5.7 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE		CEILING HEIGHT, m											
				1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	°C														
	5	1.52	1.66	2.01	2.19	2.37	2.55	2.93	3.11	3.49	4.63	5.80*			
	10	1.84	2.08	2.59	2.85	3.11	3.37	3.90	4.17	4.71	6.36	8.07*			
	20	2.38	2.78	3.57	3.96	4.35	4.75	5.55	5.95	6.76	9.27	11.88*			
	30	2.85	3.39	4.42	4.93	5.44	5.95	6.99	7.51	8.56	11.82	15.22*			
	40	3.28	3.95	5.21	5.83	6.44	7.06	8.31	8.94	10.22	14.17	18.29*			
	60	4.07	4.99	6.65	7.47	8.28	9.09	10.73	11.56	13.24	18.46	23.91*			
	70	4.44	5.47	7.33	8.23	9.13	10.04	11.87	12.79	14.66	20.46	26.53*			
80	4.80	5.93	7.98	8.97	9.96	10.95	12.96	13.97	16.03	22.40	29.07*				
10	5	1.91	1.98	2.26	2.41	2.58	2.74	3.09	3.27	3.63	4.75	5.91*			
	10	2.24	2.39	2.81	3.04	3.29	3.53	4.04	4.30	4.83	6.46	8.16*			
	20	2.76	3.05	3.75	4.13	4.50	4.89	5.67	6.06	6.86	9.35	11.95*			
	30	3.21	3.64	4.59	5.08	5.58	6.08	7.09	7.61	8.66	11.90	15.29*			
	40	3.62	4.19	5.37	5.97	6.57	7.18	8.41	9.04	10.30	14.23	18.35*			
	60	4.38	5.20	6.80	7.59	8.39	9.20	10.82	11.65	13.32	18.52	23.96*			
	70	4.74	5.67	7.46	8.35	9.24	10.14	11.95	12.87	14.73	20.52	26.59*			
	80	5.09	6.13	8.11	9.09	10.07	11.05	13.04	14.05	16.10	22.45	29.12*			
20	5	2.11	2.18	2.44	2.59	2.75	2.91	3.25	3.42	3.77	4.86	6.01*			
	10	2.49	2.61	3.01	3.23	3.45	3.69	4.18	4.43	4.95	6.55	8.24*			
	20	3.05	3.29	3.94	4.29	4.65	5.02	5.78	6.17	6.97	9.43	12.03*			
	30	3.51	3.88	4.76	5.23	5.71	6.20	7.20	7.71	8.75	11.97	15.35*			
	40	3.92	4.41	5.53	6.11	6.70	7.29	8.51	9.13	10.39	14.30	18.41*			
	60	4.67	5.40	6.94	7.72	8.50	9.30	10.91	11.73	13.40	18.58	24.02*			
	70	5.03	5.87	7.60	8.47	9.35	10.24	12.04	12.95	14.81	20.58	26.64*			
	80	5.37	6.32	8.24	9.20	10.17	11.15	13.13	14.13	16.17	22.51	29.17*			
50	5	2.49	2.55	2.82	2.97	3.13	3.29	3.62	3.79	4.13	5.18	6.31*			
	10	2.96	3.08	3.45	3.66	3.88	4.10	4.56	4.80	5.29	6.84	8.50*			
	20	3.63	3.84	4.41	4.73	5.07	5.41	6.13	6.50	7.26	9.67	12.25*			
	30	4.16	4.45	5.23	5.66	6.10	6.56	7.52	8.01	9.02	12.19	15.55*			
	40	4.61	5.00	5.98	6.51	7.06	7.63	8.81	9.41	10.64	14.51	18.60*			
	60	5.40	5.99	7.36	8.09	8.84	9.61	11.18	11.99	13.63	18.76	24.19*			
	70	5.76	6.44	8.01	8.83	9.68	10.54	12.30	13.20	15.03	20.76	26.80*			
	80	6.11	6.89	8.64	9.55	10.49	11.44	13.38	14.37	16.38	22.68	29.33*			
100	5	2.88	2.95	3.23	3.39	3.56	3.72	4.06	4.24	4.58	5.63	6.77*			
	10	3.46	3.57	3.96	4.17	4.39	4.61	5.07	5.31	5.79	7.28	8.92*			
	20	4.27	4.46	5.02	5.32	5.64	5.97	6.66	7.01	7.74	10.07	12.61*			
	30	4.88	5.15	5.87	6.27	6.69	7.13	8.03	8.50	9.46	12.55	15.88*			
	40	5.40	5.74	6.63	7.13	7.64	8.18	9.29	9.87	11.06	14.84	18.90*			
	60	6.28	6.77	8.01	8.68	9.39	10.12	11.63	12.41	14.01	19.07	24.47*			
	70	6.67	7.25	8.65	9.41	10.21	11.03	12.73	13.61	15.40	21.05	27.07*			
	80	7.04	7.69	9.27	10.12	11.00	11.91	13.80	14.76	16.74	22.97	29.59*			

SPACING = 8.0 m (RADIUS = 5.7 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TEMPERATURE
 TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	3.16	3.23	3.53	3.70	3.87	4.04	4.40	4.57	4.93	6.00	7.15*
	10	3.83	3.94	4.33	4.55	4.78	5.01	5.48	5.72	6.20	7.68	9.32*
	20	4.73	4.92	5.48	5.79	6.11	6.44	7.12	7.47	8.18	10.45	12.96*
	30	5.41	5.67	6.39	6.78	7.19	7.62	8.50	8.95	9.89	12.90	16.21*
	40	5.98	6.31	7.18	7.66	8.16	8.68	9.75	10.31	11.47	15.17	19.21*
	60	6.94	7.40	8.58	9.23	9.90	10.60	12.06	12.82	14.39	19.37	24.74*
	70	7.36	7.90	9.23	9.96	10.72	11.51	13.15	14.01	15.76	21.34	27.34*
	80	7.76	8.36	9.85	10.66	11.50	12.38	14.21	15.15	17.09	23.25	29.85*
200	5	3.39	3.46	3.77	3.95	4.12	4.31	4.67	4.85	5.22	6.31	7.49*
	10	4.12	4.24	4.64	4.87	5.10	5.34	5.82	6.06	6.55	8.04	9.69*
	20	5.11	5.29	5.87	6.18	6.51	6.84	7.52	7.87	8.58	10.82	13.31*
	30	5.84	6.10	6.82	7.22	7.63	8.05	8.92	9.37	10.29	13.25	16.53*
	40	6.46	6.78	7.65	8.12	8.62	9.12	10.18	10.73	11.86	15.50	19.51*
	60	7.49	7.94	9.09	9.72	10.38	11.06	12.49	13.23	14.76	19.67	25.02*
	70	7.94	8.45	9.74	10.45	11.19	11.96	13.56	14.40	16.12	21.63	27.60*
	80	8.36	8.93	10.37	11.16	11.98	12.83	14.61	15.53	17.44	23.53	30.10*
250	5	3.58	3.66	3.98	4.16	4.34	4.53	4.91	5.10	5.47	6.59	7.80*
	10	4.37	4.49	4.91	5.14	5.38	5.62	6.11	6.36	6.86	8.37	10.03*
	20	5.43	5.62	6.20	6.52	6.85	7.19	7.87	8.22	8.93	11.17	13.65*
	30	6.22	6.47	7.20	7.60	8.01	8.44	9.31	9.75	10.67	13.59	16.85*
	40	6.87	7.19	8.06	8.53	9.03	9.53	10.58	11.12	12.24	15.83	19.81*
	60	7.96	8.40	9.54	10.17	10.82	11.49	12.89	13.62	15.12	19.97	25.29*
	70	8.44	8.93	10.21	10.91	11.64	12.39	13.96	14.78	16.48	21.92	27.87*
	80	8.88	9.44	10.85	11.62	12.42	13.26	15.00	15.91	17.79	23.81	30.36*
300	5	3.75	3.83	4.16	4.35	4.54	4.73	5.12	5.31	5.70	6.84	8.07*
	10	4.59	4.71	5.14	5.38	5.63	5.88	6.38	6.63	7.13	8.66	10.34*
	20	5.72	5.91	6.50	6.83	7.16	7.50	8.20	8.55	9.26	11.49	13.98*
	30	6.55	6.80	7.54	7.94	8.36	8.79	9.66	10.11	11.02	13.92	17.16*
	40	7.24	7.55	8.43	8.91	9.40	9.91	10.95	11.49	12.60	16.15	20.11*
	60	8.38	8.81	9.95	10.58	11.22	11.89	13.27	13.99	15.48	20.27	25.57*
	70	8.88	9.37	10.64	11.33	12.05	12.79	14.35	15.15	16.82	22.21	28.13*
	80	9.34	9.89	11.29	12.05	12.84	13.67	15.39	16.28	18.13	24.09	30.62*
400	5	4.05	4.14	4.48	4.68	4.88	5.08	5.48	5.68	6.09	7.27	8.55*
	10	4.98	5.10	5.55	5.80	6.06	6.32	6.84	7.10	7.62	9.19	10.91*
	20	6.21	6.41	7.02	7.36	7.70	8.06	8.77	9.13	9.86	12.10	14.60*
	30	7.12	7.38	8.13	8.55	8.97	9.41	10.29	10.74	11.66	14.54	17.77*
	40	7.87	8.19	9.08	9.56	10.06	10.58	11.63	12.16	13.26	16.76	20.70*
	60	9.11	9.54	10.68	11.31	11.95	12.61	13.98	14.69	16.15	20.85	26.11*
	70	9.65	10.13	11.40	12.09	12.80	13.54	15.07	15.86	17.50	22.78	28.66*
	80	10.15	10.68	12.07	12.83	13.61	14.42	16.11	16.98	18.79	24.64	31.12*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 m (RADIUS = 5.7 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	°C												
	5	2.32	2.61	3.23	3.55	3.87	4.19	4.84	5.16	5.82	7.84	9.92*	
	10	2.96	3.44	4.39	4.87	5.34	5.82	6.79	7.28	8.26	11.30	14.45*	
	20	4.04	4.84	6.35	7.09	7.83	8.58	10.08	10.84	12.37	17.12	22.07*	
	30	4.98	6.07	8.06	9.04	10.01	10.99	12.96	13.95	15.97	22.22	28.76*	
	40	5.84	7.19	9.64	10.83	12.01	13.20	15.61	16.82	19.28	26.91	34.89*	
	60	7.42	9.26	12.52	14.10	15.68	17.26	20.45	22.07	25.34	35.49	46.13*	
	80	8.16	10.22	13.87	15.63	17.39	19.16	22.72	24.52	28.17	39.50	51.38*	
10	8.88	11.15	15.17	17.11	19.05	20.99	24.90	26.88	30.90	43.37	56.45*		
	5	2.80	2.97	3.49	3.78	4.08	4.38	5.00	5.32	5.96	7.95	10.02*	
	10	3.42	3.77	4.62	5.06	5.52	5.99	6.93	7.41	8.38	11.40	14.54*	
	20	4.44	5.12	6.54	7.26	7.98	8.71	10.20	10.95	12.47	17.20	22.15*	
	30	5.34	6.32	8.23	9.19	10.15	11.11	13.07	14.06	16.06	22.29	28.82*	
	40	6.18	7.43	9.80	10.97	12.14	13.32	15.71	16.91	19.36	26.98	34.95*	
	60	7.74	9.47	12.66	14.23	15.79	17.37	20.54	22.15	25.41	35.55	46.18*	
	80	8.46	10.42	14.01	15.75	17.50	19.26	22.80	24.60	28.24	39.56	51.44*	
20	9.17	11.35	15.30	17.23	19.15	21.08	24.99	26.96	30.97	43.42	56.50*		
	5	3.10	3.25	3.72	3.99	4.28	4.57	5.17	5.48	6.11	8.07	10.13*	
	10	3.76	4.05	4.83	5.26	5.70	6.15	7.07	7.54	8.50	11.49	14.63*	
	20	4.80	5.38	6.72	7.42	8.13	8.85	10.32	11.06	12.57	17.28	22.22*	
	30	5.69	6.56	8.40	9.34	10.28	11.24	13.17	14.16	16.16	22.37	28.89*	
	40	6.52	7.66	9.95	11.11	12.27	13.43	15.81	17.01	19.45	27.04	35.02*	
	60	8.04	9.68	12.81	14.35	15.91	17.47	20.63	22.24	25.49	35.61	46.24*	
	80	8.76	10.63	14.14	15.88	17.61	19.36	22.89	24.68	28.31	39.62	51.49*	
50	9.46	11.54	15.43	17.35	19.26	21.18	25.07	27.04	31.04	43.48	56.55*		
	5	3.66	3.80	4.25	4.51	4.78	5.05	5.62	5.91	6.51	8.40	10.43*	
	10	4.46	4.70	5.40	5.79	6.19	6.61	7.48	7.93	8.86	11.78	14.89*	
	20	5.62	6.09	7.26	7.90	8.57	9.25	10.67	11.39	12.88	17.52	22.44*	
	30	6.56	7.26	8.90	9.78	10.68	11.60	13.50	14.46	16.43	22.59	29.09*	
	40	7.40	8.33	10.42	11.52	12.64	13.78	16.11	17.29	19.71	27.25	35.20*	
	60	8.91	10.30	13.23	14.73	16.25	17.78	20.90	22.49	25.72	35.79	46.41*	
	80	9.61	11.23	14.55	16.24	17.94	19.66	23.15	24.93	28.54	39.79	51.65*	
100	10.29	12.13	15.83	17.70	19.58	21.47	25.32	27.28	31.26	43.65	56.71*		
	5	4.25	4.39	4.86	5.12	5.39	5.66	6.23	6.52	7.10	8.93	10.93*	
	10	5.21	5.44	6.11	6.49	6.88	7.28	8.11	8.54	9.43	12.25	15.32*	
	20	6.55	6.96	8.04	8.64	9.26	9.90	11.24	11.94	13.37	17.92	22.81*	
	30	7.60	8.19	9.67	10.49	11.33	12.21	14.02	14.96	16.88	22.95	29.42*	
	40	8.51	9.29	11.17	12.19	13.25	14.34	16.60	17.76	20.13	27.58	35.51*	
	60	10.09	11.25	13.93	15.35	16.81	18.30	21.35	22.92	26.10	36.10	46.69*	
	80	10.81	12.17	15.23	16.84	18.48	20.16	23.59	25.34	28.91	40.09	51.92*	
80	11.50	13.05	16.49	18.28	20.10	21.95	25.74	27.68	31.61	43.94	56.97*		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 m (RADIUS = 5.7 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s)^{1/2}

°C

1

2

4

5

6

7

9

10

12

18

24

150

5

4.69

4.82

5.30

5.57

5.85

6.13

6.71

7.00

7.59

9.41

11.40*

10

5.76

5.99

6.67

7.04

7.44

7.84

8.66

9.08

9.95

12.70

15.74*

20

7.25

7.64

8.69

9.27

9.87

10.49

11.79

12.47

13.86

18.32

23.17*

30

8.39

8.94

10.36

11.13

11.94

12.79

14.54

15.45

17.33

23.31

29.75*

40

9.36

10.08

11.86

12.83

13.85

14.90

17.09

18.22

20.55

27.92

35.82*

60

11.04

12.09

14.60

15.95

17.36

18.81

21.80

23.34

26.49

36.41

46.97*

70

11.79

13.02

15.88

17.42

19.02

20.65

24.02

25.74

29.27

40.38

52.19*

80

12.50

13.90

17.13

18.85

20.62

22.43

26.16

28.07

31.97

44.22

57.23*

200

5

5.04

5.17

5.67

5.95

6.24

6.53

7.11

7.41

8.01

9.84

11.84*

10

6.21

6.43

7.13

7.51

7.90

8.31

9.13

9.56

10.42

13.14

16.16*

20

7.82

8.20

9.24

9.82

10.41

11.03

12.30

12.96

14.33

18.71

23.53*

30

9.04

9.57

10.96

11.72

12.51

13.33

15.04

15.93

17.77

23.67

30.07*

40

10.08

10.76

12.48

13.43

14.41

15.43

17.57

18.68

20.96

28.26

36.12*

60

11.84

12.83

15.23

16.54

17.90

19.31

22.24

23.76

26.87

36.71

47.24*

70

12.62

13.77

16.51

18.00

19.54

21.14

24.44

26.15

29.64

40.67

52.45*

80

13.36

14.67

17.75

19.41

21.13

22.91

26.58

28.46

32.33

44.51

57.49*

250

5

5.33

5.48

5.99

6.27

6.57

6.86

7.46

7.77

8.37

10.22

12.25*

10

6.59

6.82

7.53

7.92

8.32

8.72

9.56

9.98

10.85

13.55

16.56*

20

8.31

8.69

9.73

10.31

10.90

11.51

12.78

13.43

14.78

19.10

23.89*

30

9.60

10.13

11.50

12.25

13.03

13.84

15.52

16.40

18.20

24.02

30.40*

40

10.69

11.36

13.05

13.98

14.94

15.94

18.04

19.13

21.38

28.59

36.43*

60

12.54

13.49

15.82

17.10

18.43

19.80

22.68

24.17

27.24

37.01

47.52*

70

13.35

14.45

17.10

18.55

20.06

21.62

24.87

26.55

30.01

40.97

52.72*

80

14.12

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.5 m (RADIUS = 6.0 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2} 0	5	0.76	0.79	0.91	0.98	1.04	1.11	1.25	1.32	1.45	1.87	2.29*
	10	0.84	0.90	1.06	1.15	1.23	1.32	1.50	1.59	1.77	2.31	2.86*
	20	0.99	1.09	1.32	1.44	1.56	1.68	1.92	2.05	2.30	3.05	3.83*
	30	1.11	1.25	1.54	1.69	1.84	1.99	2.30	2.45	2.76	3.71	4.68*
	40	1.22	1.40	1.75	1.92	2.10	2.28	2.64	2.82	3.18	4.30	5.46*
	60	1.43	1.67	2.12	2.35	2.58	2.80	3.26	3.49	3.96	5.40	6.89*
	70	1.53	1.79	2.30	2.55	2.80	3.05	3.55	3.81	4.32	5.91	7.56*
	80	1.63	1.92	2.47	2.74	3.01	3.29	3.84	4.11	4.67	6.41	8.21*
10	5	0.98	1.00	1.09	1.15	1.21	1.27	1.40	1.46	1.59	1.98	2.39*
	10	1.10	1.13	1.25	1.32	1.40	1.48	1.64	1.72	1.89	2.41	2.95*
	20	1.27	1.32	1.50	1.60	1.71	1.82	2.04	2.16	2.40	3.14	3.91*
	30	1.40	1.48	1.71	1.84	1.98	2.12	2.40	2.55	2.85	3.78	4.75*
	40	1.51	1.62	1.90	2.06	2.23	2.39	2.74	2.91	3.27	4.37	5.53*
	60	1.72	1.87	2.27	2.48	2.69	2.91	3.35	3.58	4.04	5.46	6.95*
	70	1.81	2.00	2.44	2.67	2.91	3.15	3.64	3.89	4.40	5.97	7.61*
	80	1.90	2.11	2.60	2.86	3.12	3.38	3.92	4.19	4.75	6.46	8.26*
20	5	1.08	1.09	1.19	1.25	1.31	1.37	1.50	1.56	1.69	2.08	2.48*
	10	1.22	1.24	1.37	1.44	1.52	1.59	1.75	1.83	2.00	2.50	3.04*
	20	1.42	1.46	1.63	1.73	1.83	1.94	2.16	2.27	2.50	3.22	3.98*
	30	1.57	1.63	1.85	1.97	2.10	2.23	2.51	2.65	2.94	3.85	4.82*
	40	1.70	1.78	2.05	2.19	2.35	2.51	2.84	3.01	3.35	4.44	5.59*
	60	1.92	2.05	2.40	2.60	2.80	3.01	3.44	3.67	4.12	5.52	7.00*
	70	2.02	2.17	2.57	2.79	3.02	3.25	3.73	3.98	4.47	6.03	7.67*
	80	2.11	2.29	2.73	2.98	3.23	3.48	4.01	4.27	4.82	6.52	8.31*
50	5	1.24	1.26	1.37	1.43	1.49	1.56	1.69	1.76	1.90	2.30	2.71*
	10	1.44	1.46	1.59	1.67	1.75	1.83	1.99	2.07	2.24	2.74	3.27*
	20	1.69	1.74	1.91	2.01	2.11	2.21	2.43	2.54	2.76	3.45	4.19*
	30	1.89	1.95	2.16	2.28	2.40	2.53	2.79	2.92	3.20	4.07	5.01*
	40	2.05	2.12	2.37	2.51	2.66	2.80	3.11	3.27	3.60	4.64	5.77*
	60	2.32	2.43	2.75	2.93	3.11	3.31	3.71	3.92	4.35	5.71	7.17*
	70	2.43	2.56	2.92	3.12	3.32	3.54	3.99	4.22	4.70	6.21	7.83*
	80	2.55	2.69	3.08	3.30	3.53	3.76	4.26	4.51	5.04	6.69	8.46*
100	5	1.42	1.43	1.55	1.62	1.69	1.76	1.90	1.97	2.12	2.54	2.98*
	10	1.66	1.69	1.83	1.91	1.99	2.08	2.25	2.34	2.51	3.03	3.58*
	20	1.98	2.02	2.21	2.31	2.42	2.53	2.75	2.86	3.09	3.77	4.51*
	30	2.22	2.28	2.50	2.62	2.75	2.88	3.14	3.28	3.55	4.40	5.32*
	40	2.42	2.49	2.74	2.88	3.03	3.18	3.48	3.64	3.96	4.97	6.07*
	60	2.74	2.84	3.16	3.33	3.52	3.70	4.09	4.29	4.70	6.01	7.44*
	70	2.88	3.00	3.34	3.54	3.74	3.94	4.37	4.59	5.05	6.50	8.09*
	80	3.01	3.14	3.52	3.73	3.95	4.17	4.64	4.88	5.38	6.98	8.72*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.5 m (RADIUS = 6.0 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	1.54	1.56	1.68	1.75	1.83	1.90	2.05	2.13	2.28	2.72	3.18*
	10	1.82	1.85	2.00	2.08	2.17	2.26	2.44	2.54	2.72	3.26	3.82*
	20	2.19	2.23	2.42	2.53	2.65	2.76	2.99	3.11	3.34	4.04	4.79*
	30	2.46	2.52	2.75	2.87	3.01	3.14	3.41	3.55	3.83	4.68	5.61*
	40	2.68	2.76	3.02	3.16	3.31	3.46	3.78	3.94	4.26	5.26	6.35*
	60	3.05	3.15	3.47	3.65	3.83	4.02	4.41	4.61	5.01	6.30	7.71*
	70	3.21	3.32	3.67	3.86	4.07	4.27	4.70	4.92	5.36	6.78	8.35*
	80	3.35	3.48	3.86	4.07	4.29	4.51	4.97	5.21	5.70	7.25	8.97*
200	5	1.64	1.66	1.79	1.86	1.94	2.02	2.18	2.26	2.41	2.87	3.34*
	10	1.95	1.98	2.14	2.23	2.32	2.41	2.60	2.70	2.88	3.44	4.02*
	20	2.36	2.40	2.60	2.72	2.83	2.95	3.19	3.31	3.55	4.27	5.03*
	30	2.65	2.72	2.95	3.08	3.22	3.36	3.64	3.78	4.06	4.93	5.86*
	40	2.90	2.97	3.24	3.39	3.55	3.70	4.02	4.18	4.51	5.51	6.61*
	60	3.30	3.40	3.73	3.91	4.10	4.29	4.68	4.88	5.29	6.56	7.97*
	70	3.47	3.58	3.94	4.14	4.34	4.55	4.98	5.20	5.64	7.05	8.60*
	80	3.63	3.75	4.14	4.35	4.57	4.80	5.26	5.50	5.98	7.52	9.22*
250	5	1.73	1.75	1.88	1.96	2.04	2.12	2.28	2.36	2.53	3.00	3.48*
	10	2.06	2.09	2.25	2.35	2.44	2.54	2.74	2.83	3.03	3.60	4.20*
	20	2.50	2.55	2.75	2.87	2.99	3.11	3.36	3.48	3.73	4.47	5.25*
	30	2.82	2.88	3.13	3.26	3.40	3.55	3.83	3.98	4.27	5.15	6.10*
	40	3.08	3.16	3.44	3.59	3.75	3.91	4.24	4.40	4.73	5.75	6.85*
	60	3.51	3.62	3.95	4.14	4.33	4.53	4.92	5.13	5.54	6.81	8.21*
	70	3.70	3.81	4.18	4.38	4.59	4.80	5.23	5.45	5.90	7.30	8.85*
	80	3.87	3.99	4.38	4.60	4.83	5.05	5.52	5.76	6.24	7.77	9.46*
300	5	1.81	1.83	1.96	2.04	2.13	2.21	2.38	2.46	2.63	3.11	3.61*
	10	2.16	2.19	2.36	2.46	2.56	2.66	2.86	2.96	3.16	3.75	4.36*
	20	2.63	2.68	2.89	3.01	3.13	3.26	3.51	3.64	3.89	4.64	5.44*
	30	2.97	3.03	3.28	3.42	3.57	3.71	4.01	4.16	4.46	5.35	6.31*
	40	3.25	3.33	3.61	3.77	3.93	4.10	4.43	4.60	4.94	5.96	7.08*
	60	3.70	3.81	4.15	4.34	4.54	4.74	5.14	5.35	5.76	7.04	8.45*
	70	3.90	4.01	4.38	4.59	4.80	5.02	5.46	5.68	6.13	7.53	9.08*
	80	4.08	4.20	4.60	4.82	5.05	5.28	5.75	5.99	6.48	8.01	9.69*
400	5	1.94	1.96	2.10	2.19	2.27	2.36	2.54	2.63	2.80	3.30	3.83*
	10	2.33	2.36	2.54	2.64	2.75	2.85	3.06	3.17	3.38	3.99	4.64*
	20	2.85	2.90	3.12	3.25	3.38	3.51	3.78	3.91	4.17	4.96	5.79*
	30	3.22	3.29	3.55	3.70	3.85	4.01	4.31	4.47	4.78	5.70	6.69*
	40	3.53	3.61	3.91	4.07	4.24	4.42	4.76	4.94	5.29	6.34	7.48*
	60	4.03	4.14	4.49	4.69	4.90	5.10	5.52	5.73	6.16	7.46	8.88*
	70	4.25	4.36	4.75	4.96	5.18	5.40	5.85	6.08	6.54	7.96	9.52*
	80	4.44	4.57	4.98	5.21	5.45	5.68	6.17	6.41	6.91	8.44	10.13*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.5 m (RADIUS = 6.0 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s²)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2} 0	°C											
	5	1.09	1.16	1.35	1.46	1.57	1.68	1.90	2.01	2.23	2.91	3.59*
	10	1.25	1.37	1.66	1.80	1.95	2.10	2.40	2.55	2.86	3.79	4.75*
	20	1.54	1.74	2.17	2.38	2.60	2.81	3.25	3.47	3.91	5.28	6.69*
	30	1.79	2.06	2.61	2.89	3.16	3.44	3.99	4.27	4.84	6.58	8.39*
	40	2.02	2.36	3.02	3.35	3.68	4.01	4.68	5.01	5.69	7.78	9.95*
	60	2.43	2.90	3.78	4.21	4.63	5.06	5.93	6.36	7.24	9.97	12.81*
	70	2.63	3.16	4.13	4.60	5.08	5.55	6.51	6.99	7.97	10.99	14.14*
10	80	2.82	3.40	4.47	4.99	5.51	6.03	7.07	7.60	8.67	11.98	15.43*
	5	1.39	1.42	1.58	1.67	1.76	1.86	2.06	2.16	2.37	3.02	3.70*
	10	1.59	1.65	1.87	2.00	2.13	2.26	2.54	2.69	2.98	3.89	4.83*
	20	1.88	2.01	2.35	2.55	2.75	2.95	3.37	3.58	4.02	5.36	6.76*
	30	2.13	2.31	2.79	3.04	3.30	3.56	4.10	4.38	4.93	6.66	8.45*
	40	2.34	2.59	3.19	3.50	3.81	4.13	4.78	5.11	5.78	7.85	10.01*
	60	2.74	3.12	3.92	4.33	4.75	5.17	6.02	6.45	7.32	10.03	12.86*
	70	2.93	3.36	4.27	4.73	5.19	5.66	6.60	7.08	8.05	11.05	14.20*
20	80	3.11	3.60	4.60	5.11	5.62	6.13	7.16	7.68	8.75	12.04	15.48*
	5	1.53	1.56	1.72	1.81	1.90	2.00	2.20	2.30	2.50	3.13	3.80*
	10	1.77	1.82	2.03	2.15	2.28	2.41	2.68	2.82	3.10	3.99	4.92*
	20	2.10	2.21	2.52	2.70	2.89	3.09	3.49	3.70	4.12	5.44	6.83*
	30	2.37	2.52	2.95	3.19	3.43	3.69	4.21	4.48	5.03	6.73	8.52*
	40	2.60	2.80	3.34	3.63	3.94	4.25	4.88	5.20	5.86	7.92	10.07*
	60	3.00	3.32	4.07	4.46	4.86	5.27	6.11	6.54	7.40	10.09	12.92*
	70	3.19	3.56	4.41	4.85	5.30	5.76	6.69	7.16	8.12	11.11	14.25*
50	80	3.37	3.79	4.74	5.23	5.72	6.22	7.25	7.77	8.82	12.10	15.53*
	5	1.79	1.82	1.98	2.08	2.18	2.28	2.48	2.58	2.79	3.42	4.08*
	10	2.10	2.15	2.36	2.48	2.61	2.74	3.00	3.14	3.41	4.26	5.17*
	20	2.52	2.61	2.91	3.08	3.26	3.44	3.82	4.01	4.41	5.68	7.05*
	30	2.84	2.97	3.36	3.57	3.80	4.04	4.52	4.78	5.30	6.95	8.71*
	40	3.11	3.28	3.75	4.02	4.29	4.58	5.18	5.48	6.12	8.12	10.25*
	60	3.57	3.82	4.47	4.83	5.20	5.58	6.38	6.79	7.63	10.28	13.08*
	70	3.78	4.07	4.80	5.21	5.63	6.06	6.95	7.41	8.35	11.29	14.41*
100	80	3.97	4.30	5.13	5.57	6.04	6.52	7.50	8.01	9.04	12.27	15.69*
	5	2.06	2.09	2.26	2.36	2.47	2.58	2.79	2.90	3.12	3.77	4.44*
	10	2.44	2.49	2.71	2.84	2.97	3.11	3.38	3.52	3.80	4.65	5.56*
	20	2.96	3.04	3.35	3.52	3.70	3.88	4.26	4.45	4.84	6.07	7.40*
	30	3.34	3.46	3.84	4.06	4.28	4.51	4.98	5.22	5.72	7.31	9.04*
	40	3.66	3.82	4.27	4.53	4.79	5.07	5.63	5.92	6.53	8.46	10.56*
	60	4.20	4.42	5.02	5.36	5.71	6.07	6.82	7.21	8.02	10.59	13.36*
	70	4.44	4.69	5.37	5.74	6.13	6.53	7.38	7.81	8.72	11.59	14.68*
80	4.66	4.94	5.69	6.11	6.54	6.98	7.92	8.40	9.40	12.56	15.95*	

SPACING = 8.5 m (RADIUS = 6.0 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TEMPERATURE
 TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	2.25	2.28	2.46	2.57	2.68	2.80	3.02	3.13	3.36	4.03	4.73*
	10	2.69	2.74	2.97	3.11	3.25	3.39	3.67	3.81	4.10	4.96	5.89*
	20	3.27	3.36	3.68	3.85	4.04	4.22	4.61	4.80	5.19	6.41	7.74*
	30	3.71	3.83	4.22	4.43	4.66	4.89	5.36	5.60	6.09	7.65	9.36*
	40	4.07	4.22	4.68	4.93	5.20	5.47	6.03	6.31	6.90	8.79	10.86*
	60	4.67	4.88	5.47	5.80	6.14	6.49	7.22	7.60	8.38	10.89	13.63*
	70	4.93	5.17	5.83	6.19	6.57	6.96	7.78	8.20	9.07	11.88	14.94*
	80	5.17	5.44	6.16	6.56	6.98	7.41	8.31	8.78	9.75	12.84	16.20*
200	5	2.40	2.44	2.63	2.74	2.86	2.97	3.21	3.33	3.56	4.25	4.97*
	10	2.89	2.94	3.18	3.32	3.47	3.61	3.91	4.05	4.35	5.23	6.17*
	20	3.53	3.62	3.94	4.13	4.32	4.51	4.90	5.10	5.49	6.72	8.05*
	30	4.01	4.13	4.52	4.75	4.97	5.21	5.68	5.93	6.42	7.96	9.66*
	40	4.40	4.55	5.01	5.27	5.54	5.81	6.37	6.66	7.24	9.10	11.15*
	60	5.05	5.25	5.85	6.18	6.51	6.86	7.59	7.96	8.73	11.19	13.91*
	70	5.33	5.56	6.22	6.58	6.96	7.34	8.15	8.56	9.42	12.17	15.20*
	80	5.59	5.85	6.57	6.96	7.38	7.80	8.68	9.14	10.08	13.13	16.46*
250	5	2.54	2.57	2.77	2.89	3.01	3.13	3.37	3.49	3.73	4.44	5.18*
	10	3.06	3.11	3.37	3.51	3.66	3.81	4.11	4.26	4.56	5.47	6.43*
	20	3.75	3.84	4.18	4.36	4.56	4.75	5.15	5.35	5.76	7.00	8.34*
	30	4.26	4.38	4.79	5.02	5.25	5.49	5.97	6.22	6.71	8.26	9.95*
	40	4.68	4.83	5.30	5.57	5.84	6.11	6.68	6.97	7.55	9.40	11.44*
	60	5.37	5.58	6.18	6.51	6.85	7.20	7.92	8.29	9.05	11.48	14.17*
	70	5.67	5.90	6.56	6.93	7.30	7.69	8.48	8.90	9.74	12.46	15.46*
	80	5.95	6.21	6.93	7.32	7.73	8.15	9.03	9.48	10.41	13.40	16.71*
300	5	2.65	2.69	2.90	3.02	3.14	3.26	3.51	3.64	3.88	4.61	5.37*
	10	3.21	3.27	3.53	3.67	3.83	3.98	4.29	4.45	4.76	5.68	6.66*
	20	3.95	4.04	4.38	4.57	4.77	4.97	5.38	5.59	6.00	7.25	8.60*
	30	4.49	4.61	5.02	5.26	5.49	5.74	6.23	6.48	6.98	8.53	10.23*
	40	4.93	5.08	5.56	5.83	6.11	6.39	6.96	7.25	7.84	9.68	11.71*
	60	5.66	5.87	6.47	6.81	7.15	7.50	8.22	8.59	9.35	11.76	14.44*
	70	5.98	6.21	6.87	7.24	7.61	8.00	8.80	9.21	10.05	12.74	15.72*
	80	6.27	6.53	7.25	7.64	8.05	8.47	9.35	9.79	10.72	13.68	16.96*
400	5	2.85	2.89	3.11	3.24	3.37	3.50	3.76	3.89	4.15	4.91	5.70*
	10	3.47	3.53	3.80	3.96	4.12	4.28	4.61	4.77	5.09	6.05	7.07*
	20	4.28	4.38	4.74	4.94	5.15	5.36	5.78	5.99	6.42	7.70	9.09*
	30	4.88	5.00	5.43	5.67	5.92	6.17	6.68	6.94	7.45	9.03	10.74*
	40	5.37	5.52	6.02	6.29	6.57	6.86	7.45	7.75	8.35	10.20	12.24*
	60	6.16	6.37	6.99	7.33	7.68	8.04	8.77	9.14	9.90	12.30	14.95*
	70	6.51	6.74	7.41	7.79	8.17	8.56	9.36	9.77	10.61	13.27	16.23*
	80	6.82	7.08	7.81	8.21	8.63	9.05	9.93	10.37	11.29	14.21	17.46*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.5 m (RADIUS = 6.0 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
0	5	1.60	1.74	2.09	2.27	2.45	2.64	3.01	3.19	3.57	4.72	5.89*	
	10	1.94	2.18	2.70	2.96	3.22	3.48	4.02	4.28	4.83	6.49	8.20*	
	20	2.51	2.92	3.72	4.11	4.51	4.91	5.71	6.12	6.94	9.46	12.08*	
	30	3.00	3.56	4.61	5.13	5.64	6.16	7.20	7.72	8.79	12.06	15.48*	
	40	3.46	4.15	5.43	6.06	6.68	7.30	8.56	9.20	10.48	14.46	18.60*	
	60	4.30	5.24	6.94	7.76	8.58	9.41	11.06	11.90	13.60	18.84	24.32*	
	70	4.69	5.74	7.64	8.56	9.47	10.39	12.23	13.17	15.05	20.89	26.99*	
	80	5.06	6.23	8.32	9.33	10.33	11.34	13.36	14.38	16.45	22.86	29.57*	
10	5	2.00	2.07	2.34	2.50	2.66	2.83	3.18	3.35	3.72	4.84	6.00*	
	10	2.35	2.49	2.92	3.15	3.40	3.65	4.16	4.42	4.95	6.58	8.29*	
	20	2.90	3.19	3.91	4.28	4.66	5.05	5.83	6.23	7.04	9.54	12.15*	
	30	3.37	3.81	4.78	5.28	5.78	6.28	7.31	7.83	8.88	12.14	15.54*	
	40	3.81	4.39	5.59	6.20	6.81	7.42	8.67	9.30	10.57	14.53	18.66*	
	60	4.61	5.45	7.08	7.89	8.70	9.51	11.16	11.99	13.68	18.90	24.37*	
	70	4.99	5.95	7.78	8.68	9.58	10.49	12.32	13.25	15.13	20.95	27.04*	
	80	5.36	6.43	8.45	9.45	10.44	11.44	13.45	14.47	16.53	22.92	29.62*	
20	5	2.21	2.27	2.53	2.68	2.84	3.00	3.34	3.51	3.86	4.95	6.10*	
	10	2.61	2.73	3.12	3.34	3.57	3.81	4.30	4.55	5.07	6.68	8.37*	
	20	3.20	3.44	4.09	4.45	4.81	5.19	5.95	6.35	7.14	9.62	12.22*	
	30	3.68	4.06	4.95	5.43	5.92	6.41	7.42	7.93	8.97	12.21	15.61*	
	40	4.12	4.62	5.75	6.34	6.94	7.54	8.77	9.39	10.66	14.60	18.72*	
	60	4.91	5.66	7.23	8.02	8.82	9.62	11.25	12.08	13.75	18.96	24.43*	
	70	5.29	6.16	7.92	8.81	9.70	10.59	12.41	13.33	15.20	21.01	27.10*	
	80	5.65	6.63	8.59	9.57	10.55	11.53	13.53	14.55	16.60	22.98	29.67*	
50	5	2.60	2.66	2.92	3.08	3.23	3.39	3.72	3.89	4.22	5.28	6.40*	
	10	3.10	3.21	3.58	3.79	4.00	4.23	4.69	4.93	5.42	6.97	8.63*	
	20	3.81	4.01	4.58	4.90	5.24	5.58	6.31	6.68	7.45	9.87	12.44*	
	30	4.36	4.65	5.43	5.87	6.32	6.78	7.74	8.24	9.25	12.43	15.81*	
	40	4.83	5.23	6.21	6.75	7.31	7.89	9.07	9.68	10.92	14.80	18.91*	
	60	5.67	6.26	7.65	8.40	9.16	9.94	11.52	12.34	13.99	19.15	24.59*	
	70	6.04	6.74	8.33	9.17	10.03	10.90	12.68	13.58	15.43	21.19	27.26*	
	80	6.41	7.21	8.99	9.92	10.87	11.83	13.79	14.79	16.82	23.15	29.83*	
100	5	3.01	3.07	3.35	3.50	3.67	3.83	4.17	4.34	4.69	5.74	6.86*	
	10	3.62	3.73	4.10	4.31	4.53	4.75	5.21	5.45	5.93	7.42	9.05*	
	20	4.47	4.65	5.20	5.51	5.83	6.16	6.85	7.20	7.93	10.27	12.80*	
	30	5.11	5.37	6.09	6.50	6.92	7.35	8.26	8.73	9.70	12.80	16.14*	
	40	5.65	5.99	6.89	7.39	7.90	8.44	9.57	10.15	11.34	15.14	19.21*	
	60	6.57	7.07	8.32	9.01	9.72	10.45	11.98	12.76	14.38	19.46	24.87*	
	70	6.98	7.57	8.99	9.76	10.57	11.40	13.11	14.00	15.80	21.49	27.52*	
	80	7.37	8.04	9.63	10.50	11.39	12.32	14.21	15.19	17.18	23.44	30.09*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.5 m (RADIUS = 6.0 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	3.30	3.37	3.65	3.82	3.99	4.16	4.51	4.69	5.04	6.11	7.25*
	10	4.00	4.10	4.49	4.71	4.93	5.16	5.63	5.87	6.35	7.83	9.45*
	20	4.95	5.13	5.68	5.99	6.31	6.64	7.32	7.67	8.38	10.66	13.16*
	30	5.66	5.91	6.62	7.02	7.43	7.86	8.74	9.20	10.14	13.16	16.46*
	40	6.26	6.58	7.45	7.93	8.43	8.95	10.04	10.60	11.76	15.48	19.52*
	60	7.26	7.72	8.91	9.56	10.24	10.95	12.42	13.19	14.76	19.77	25.15*
	70	7.70	8.24	9.58	10.32	11.09	11.88	13.55	14.40	16.17	21.79	27.79*
	80	8.12	8.73	10.23	11.05	11.91	12.79	14.63	15.59	17.54	23.73	30.34*
200	5	3.54	3.61	3.91	4.08	4.25	4.43	4.80	4.98	5.34	6.43	7.59*
	10	4.31	4.41	4.81	5.03	5.26	5.50	5.98	6.22	6.70	8.20	9.82*
	20	5.34	5.52	6.08	6.39	6.72	7.05	7.73	8.08	8.79	11.03	13.51*
	30	6.11	6.36	7.07	7.47	7.88	8.30	9.17	9.62	10.55	13.52	16.78*
	40	6.75	7.07	7.93	8.41	8.90	9.41	10.48	11.03	12.16	15.82	19.82*
	60	7.83	8.27	9.43	10.07	10.73	11.42	12.85	13.60	15.14	20.08	25.42*
	70	8.30	8.81	10.11	10.83	11.58	12.35	13.97	14.81	16.54	22.08	28.06*
	80	8.74	9.32	10.77	11.56	12.39	13.25	15.05	15.98	17.90	24.02	30.60*
250	5	3.75	3.81	4.12	4.30	4.48	4.67	5.04	5.23	5.60	6.71	7.89*
	10	4.57	4.68	5.08	5.31	5.55	5.79	6.28	6.53	7.02	8.53	10.16*
	20	5.68	5.85	6.43	6.74	7.07	7.41	8.09	8.44	9.15	11.39	13.85*
	30	6.50	6.74	7.46	7.86	8.27	8.70	9.57	10.02	10.93	13.86	17.10*
	40	7.18	7.49	8.35	8.83	9.32	9.83	10.88	11.43	12.55	16.15	20.12*
	60	8.32	8.76	9.90	10.53	11.18	11.85	13.26	14.00	15.51	20.38	25.70*
	70	8.82	9.31	10.60	11.30	12.03	12.79	14.37	15.20	16.90	22.38	28.32*
	80	9.28	9.84	11.26	12.04	12.85	13.69	15.45	16.36	18.25	24.31	30.86*
300	5	3.92	3.99	4.31	4.49	4.68	4.87	5.25	5.45	5.83	6.97	8.17*
	10	4.80	4.91	5.33	5.56	5.81	6.05	6.55	6.80	7.30	8.83	10.48*
	20	5.97	6.15	6.73	7.06	7.39	7.73	8.42	8.78	9.49	11.72	14.18*
	30	6.84	7.09	7.81	8.22	8.63	9.06	9.93	10.38	11.29	14.20	17.42*
	40	7.57	7.87	8.74	9.21	9.71	10.22	11.26	11.80	12.92	16.48	20.42*
	60	8.76	9.19	10.32	10.95	11.59	12.26	13.66	14.38	15.87	20.69	25.97*
	70	9.28	9.77	11.04	11.73	12.46	13.20	14.77	15.58	17.26	22.67	28.59*
	80	9.77	10.31	11.71	12.48	13.28	14.11	15.84	16.74	18.60	24.59	31.11*
400	5	4.23	4.31	4.64	4.83	5.03	5.23	5.63	5.83	6.23	7.41	8.65*
	10	5.20	5.31	5.75	6.00	6.25	6.51	7.02	7.28	7.80	9.37	11.05*
	20	6.49	6.67	7.27	7.61	7.95	8.30	9.01	9.37	10.10	12.34	14.80*
	30	7.44	7.68	8.43	8.84	9.26	9.70	10.58	11.03	11.95	14.83	18.03*
	40	8.23	8.53	9.41	9.89	10.39	10.90	11.95	12.49	13.60	17.11	21.01*
	60	9.52	9.94	11.08	11.70	12.35	13.01	14.39	15.10	16.56	21.28	26.52*
	70	10.08	10.56	11.82	12.51	13.23	13.97	15.50	16.30	17.94	23.25	29.11*
	80	10.60	11.13	12.52	13.28	14.07	14.88	16.58	17.46	19.28	25.16	31.62*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.5 m (RADIUS = 6.0 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
0	5	2.45	2.74	3.36	3.68	4.00	4.32	4.97	5.30	5.96	7.99	10.08*	
	10	3.12	3.61	4.57	5.05	5.54	6.02	6.99	7.48	8.47	11.53	14.69*	
	20	4.26	5.08	6.62	7.37	8.12	8.87	10.38	11.15	12.69	17.47	22.44*	
	30	5.25	6.37	8.41	9.39	10.38	11.37	13.36	14.36	16.39	22.68	29.24*	
	40	6.17	7.56	10.05	11.26	12.46	13.66	16.09	17.31	19.79	27.47	35.49*	
	60	7.84	9.73	13.06	14.66	16.26	17.86	21.09	22.72	26.01	36.23	46.92*	
	70	8.62	10.74	14.46	16.26	18.04	19.83	23.43	25.25	28.92	40.33	52.27*	
	80	9.37	11.72	15.82	17.80	19.76	21.72	25.68	27.68	31.73	44.28	57.42*	
10	5	2.94	3.11	3.63	3.92	4.21	4.52	5.15	5.46	6.11	8.11	10.18*	
	10	3.59	3.94	4.80	5.25	5.72	6.18	7.14	7.62	8.60	11.62	14.78*	
	20	4.67	5.36	6.81	7.54	8.27	9.01	10.51	11.26	12.80	17.55	22.52*	
	30	5.63	6.63	8.58	9.55	10.52	11.49	13.47	14.47	16.49	22.76	29.31*	
	40	6.52	7.80	10.21	11.40	12.59	13.78	16.19	17.41	19.88	27.54	35.55*	
	60	8.16	9.94	13.20	14.79	16.38	17.97	21.18	22.81	26.09	36.29	46.98*	
	70	8.93	10.95	14.61	16.38	18.16	19.93	23.52	25.33	29.00	40.39	52.32*	
	80	9.67	11.92	15.96	17.92	19.87	21.82	25.77	27.76	31.80	44.34	57.48*	
20	5	3.25	3.39	3.87	4.14	4.42	4.71	5.31	5.62	6.25	8.22	10.28*	
	10	3.95	4.24	5.02	5.45	5.89	6.35	7.28	7.75	8.72	11.72	14.86*	
	20	5.04	5.64	7.00	7.70	8.42	9.15	10.63	11.38	12.90	17.63	22.59*	
	30	5.99	6.88	8.75	9.70	10.66	11.62	13.58	14.57	16.58	22.83	29.38*	
	40	6.86	8.03	10.37	11.54	12.72	13.90	16.29	17.51	19.97	27.61	35.61*	
	60	8.47	10.16	13.35	14.92	16.50	18.08	21.28	22.89	26.17	36.36	47.03*	
	70	9.23	11.15	14.75	16.51	18.27	20.03	23.61	25.41	29.08	40.45	52.38*	
	80	9.96	12.12	16.09	18.04	19.98	21.92	25.86	27.85	31.88	44.40	57.53*	
50	5	3.84	3.96	4.41	4.67	4.93	5.21	5.78	6.07	6.67	8.56	10.59*	
	10	4.67	4.91	5.60	5.99	6.40	6.82	7.70	8.15	9.08	12.01	15.12*	
	20	5.89	6.36	7.55	8.20	8.87	9.56	10.99	11.72	13.21	17.88	22.81*	
	30	6.88	7.59	9.26	10.15	11.06	12.00	13.90	14.88	16.86	23.05	29.58*	
	40	7.76	8.71	10.85	11.96	13.10	14.25	16.60	17.79	20.23	27.81	35.80*	
	60	9.36	10.79	13.78	15.31	16.84	18.40	21.55	23.15	26.41	36.54	47.20*	
	70	10.10	11.77	15.16	16.88	18.60	20.34	23.87	25.66	29.30	40.63	52.54*	
	80	10.82	12.71	16.50	18.39	20.30	22.22	26.11	28.09	32.10	44.57	57.68*	
100	5	4.45	4.58	5.03	5.29	5.56	5.84	6.40	6.69	7.27	9.10	11.09*	
	10	5.45	5.67	6.34	6.72	7.11	7.51	8.34	8.77	9.66	12.49	15.55*	
	20	6.86	7.26	8.35	8.95	9.57	10.22	11.57	12.27	13.72	18.29	23.18*	
	30	7.96	8.55	10.05	10.87	11.73	12.61	14.44	15.39	17.32	23.42	29.91*	
	40	8.91	9.70	11.61	12.65	13.72	14.83	17.10	18.27	20.66	28.16	36.10*	
	60	10.58	11.77	14.49	15.94	17.42	18.92	22.01	23.59	26.80	36.86	47.48*	
	70	11.34	12.73	15.85	17.49	19.15	20.85	24.31	26.08	29.68	40.93	52.81*	
	80	12.06	13.66	17.17	18.98	20.83	22.71	26.54	28.49	32.46	44.86	57.94*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.5 m (RADIUS = 6.0 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s)^{1/2}

	1	2	4	5	6	7	9	10	12	18	24
150	4.90	5.02	5.50	5.76	6.04	6.32	6.89	7.18	7.77	9.59	11.56*
	6.03	6.24	6.91	7.29	7.68	8.08	8.90	9.32	10.19	12.95	15.98*
	7.58	7.96	9.01	9.60	10.20	10.83	12.13	12.81	14.21	18.69	23.54*
	8.78	9.33	10.75	11.54	12.35	13.20	14.97	15.89	17.78	23.79	30.23*
	9.80	10.52	12.32	13.30	14.33	15.39	17.60	18.74	21.09	28.50	36.41*
	11.56	12.63	15.18	16.56	17.98	19.44	22.46	24.02	27.19	37.17	47.76*
	12.35	13.60	16.52	18.09	19.70	21.35	24.75	26.50	30.05	41.23	53.07*
	13.10	14.54	17.82	19.57	21.36	23.20	26.97	28.89	32.82	45.15	58.20*
200	5.27	5.39	5.88	6.15	6.43	6.72	7.31	7.60	8.20	10.03	12.00*
	6.49	6.70	7.39	7.77	8.16	8.56	9.39	9.81	10.67	13.40	16.39*
	8.18	8.55	9.59	10.16	10.76	11.38	12.66	13.32	14.69	19.09	23.90*
	9.46	9.98	11.37	12.14	12.93	13.76	15.48	16.38	18.23	24.15	30.56*
	10.54	11.23	12.96	13.91	14.91	15.94	18.09	19.21	21.51	28.84	36.72*
	12.39	13.40	15.83	17.15	18.53	19.96	22.92	24.44	27.57	37.48	48.04*
	13.21	14.38	17.16	18.67	20.24	21.85	25.19	26.91	30.43	41.53	53.34*
	13.99	15.33	18.45	20.14	21.89	23.68	27.39	29.29	33.19	45.44	58.46*
250	5.58	5.70	6.20	6.48	6.77	7.07	7.67	7.97	8.57	10.42	12.41*
	6.89	7.10	7.80	8.18	8.58	8.99	9.82	10.25	11.11	13.82	16.80*
	8.69	9.05	10.09	10.67	11.26	11.87	13.14	13.80	15.15	19.48	24.26*
	10.04	10.56	11.93	12.68	13.47	14.28	15.97	16.85	18.67	24.52	30.89*
	11.19	11.85	13.55	14.48	15.45	16.46	18.57	19.67	21.93	29.18	37.02*
	13.12	14.08	16.44	17.72	19.07	20.46	23.36	24.87	27.96	37.79	48.31*
	13.97	15.09	17.77	19.24	20.76	22.34	25.62	27.32	30.80	41.83	53.61*
	14.78	16.05	19.06	20.70	22.40	24.16	27.81	29.69	33.55	45.73	58.72*
300	5.85	5.98	6.49	6.78	7.08	7.38	7.99	8.30	8.91	10.78	12.79*
	7.25	7.46	8.16	8.56	8.96	9.38	10.22	10.64	11.51	14.22	17.19*
	9.14	9.50	10.55	11.12	11.72	12.33	13.59	14.25	15.58	19.87	24.61*
	10.56	11.07	12.43	13.18	13.96	14.77	16.44	17.31	19.10	24.88	31.21*
	11.76	12.40	14.08	15.00	15.96	16.96	19.03	20.11	22.34	29.52	37.33*
	13.77	14.70	17.01	18.27	19.58	20.95	23.80	25.29	28.34	38.09	48.59*
	14.66	15.73	18.35	19.78	21.27	22.82	26.05	27.72	31.17	42.12	53.87*
	15.49	16.71	19.64	21.24	22.91	24.63	28.23	30.09	33.90	46.02	58.98*
400	6.33	6.46	7.00	7.30	7.61	7.92	8.55	8.87	9.51	11.42	13.47*
	7.86	8.08	8.80	9.21	9.63	10.05	10.91	11.35	12.23	14.95	17.93*
	9.93	10.28	11.34	11.93	12.53	13.15	14.42	15.06	16.39	20.62	25.31*
	11.47	11.96	13.33	14.08	14.85	15.65	17.31	18.16	19.92	25.59	31.86*
	12.76	13.38	15.05	15.96	16.90	17.88	19.91	20.97	23.15	30.19	37.93*
	14.91	15.80	18.05	19.28	20.56	21.89	24.66	26.11	29.10	38.71	49.14*
	15.85	16.87	19.41	20.80	22.25	23.75	26.89	28.53	31.90	42.72	54.40*
	16.73	17.89	20.72	22.27	23.88	25.55	29.05	30.87	34.62	46.59	59.49*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.0 m (RADIUS = 6.4 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m										
(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
0	5	0.80	0.83	0.94	1.01	1.08	1.14	1.28	1.35	1.49	1.90	2.32*
	10	0.89	0.94	1.10	1.19	1.27	1.36	1.54	1.63	1.81	2.35	2.91*
	20	1.04	1.14	1.37	1.49	1.61	1.73	1.98	2.10	2.35	3.11	3.89*
	30	1.17	1.31	1.60	1.75	1.90	2.05	2.36	2.51	2.82	3.78	4.76*
	40	1.29	1.46	1.82	1.99	2.17	2.35	2.71	2.89	3.26	4.39	5.55*
	60	1.51	1.75	2.21	2.44	2.66	2.89	3.36	3.59	4.06	5.51	7.00*
	70	1.61	1.88	2.39	2.64	2.90	3.15	3.66	3.91	4.43	6.03	7.68*
	80	1.71	2.01	2.57	2.84	3.12	3.39	3.95	4.23	4.79	6.53	8.34*
10	5	1.03	1.04	1.13	1.19	1.25	1.31	1.43	1.50	1.62	2.02	2.42*
	10	1.15	1.17	1.29	1.37	1.44	1.52	1.68	1.76	1.93	2.45	2.99*
	20	1.33	1.37	1.55	1.65	1.76	1.87	2.10	2.22	2.45	3.19	3.96*
	30	1.47	1.54	1.77	1.90	2.04	2.18	2.47	2.62	2.92	3.85	4.82*
	40	1.59	1.69	1.98	2.14	2.30	2.47	2.82	2.99	3.35	4.46	5.61*
	60	1.80	1.96	2.35	2.57	2.78	3.00	3.45	3.68	4.14	5.57	7.06*
	70	1.90	2.08	2.53	2.77	3.01	3.25	3.75	4.00	4.51	6.09	7.74*
	80	1.99	2.21	2.70	2.96	3.23	3.49	4.04	4.31	4.87	6.59	8.39*
20	5	1.13	1.13	1.23	1.29	1.35	1.41	1.54	1.60	1.73	2.12	2.52*
	10	1.28	1.29	1.42	1.49	1.56	1.64	1.80	1.88	2.04	2.55	3.08*
	20	1.48	1.52	1.69	1.79	1.89	2.00	2.21	2.33	2.56	3.28	4.04*
	30	1.64	1.70	1.92	2.04	2.17	2.30	2.58	2.72	3.01	3.93	4.89*
	40	1.78	1.86	2.12	2.27	2.43	2.59	2.92	3.09	3.44	4.53	5.67*
	60	2.01	2.14	2.49	2.69	2.90	3.11	3.54	3.77	4.22	5.63	7.12*
	70	2.11	2.27	2.67	2.89	3.12	3.35	3.84	4.08	4.59	6.15	7.79*
	80	2.21	2.39	2.84	3.08	3.34	3.59	4.12	4.39	4.94	6.65	8.44*
50	5	1.30	1.31	1.41	1.47	1.54	1.60	1.74	1.80	1.94	2.34	2.74*
	10	1.50	1.52	1.65	1.72	1.80	1.88	2.04	2.12	2.29	2.79	3.31*
	20	1.77	1.81	1.98	2.07	2.17	2.28	2.49	2.60	2.82	3.51	4.25*
	30	1.97	2.03	2.23	2.35	2.47	2.60	2.86	3.00	3.27	4.15	5.08*
	40	2.14	2.21	2.46	2.59	2.74	2.89	3.20	3.36	3.69	4.73	5.86*
	60	2.42	2.53	2.85	3.03	3.21	3.41	3.81	4.02	4.45	5.82	7.28*
	70	2.54	2.67	3.02	3.22	3.43	3.65	4.10	4.33	4.81	6.33	7.95*
	80	2.66	2.80	3.19	3.41	3.64	3.88	4.38	4.63	5.16	6.83	8.60*
100	5	1.48	1.49	1.60	1.67	1.74	1.81	1.95	2.02	2.16	2.59	3.01*
	10	1.73	1.75	1.89	1.97	2.05	2.14	2.31	2.40	2.57	3.09	3.62*
	20	2.07	2.11	2.28	2.39	2.49	2.60	2.82	2.93	3.16	3.84	4.57*
	30	2.32	2.37	2.58	2.70	2.83	2.96	3.22	3.36	3.63	4.48	5.40*
	40	2.52	2.59	2.84	2.98	3.12	3.27	3.58	3.73	4.05	5.06	6.15*
	60	2.86	2.96	3.27	3.44	3.63	3.81	4.20	4.40	4.81	6.13	7.55*
	70	3.01	3.12	3.46	3.65	3.86	4.06	4.49	4.71	5.17	6.63	8.21*
	80	3.14	3.27	3.64	3.85	4.07	4.30	4.77	5.01	5.51	7.12	8.85*

SPACING = 9.0 m (RADIUS = 6.4 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TEMPERATURE
 TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	1.61	1.62	1.74	1.81	1.88	1.96	2.11	2.18	2.33	2.77	3.22*
	10	1.90	1.92	2.07	2.15	2.24	2.33	2.51	2.60	2.78	3.32	3.87*
	20	2.28	2.32	2.51	2.62	2.73	2.84	3.07	3.18	3.41	4.12	4.85*
	30	2.57	2.62	2.84	2.97	3.10	3.23	3.50	3.64	3.92	4.77	5.68*
	40	2.80	2.87	3.12	3.26	3.41	3.57	3.88	4.04	4.36	5.36	6.44*
	60	3.18	3.27	3.59	3.77	3.95	4.14	4.53	4.73	5.13	6.42	7.82*
	70	3.34	3.45	3.80	3.99	4.19	4.40	4.82	5.04	5.49	6.92	8.47*
	80	3.50	3.62	3.99	4.20	4.42	4.64	5.11	5.34	5.83	7.40	9.11*
200	5	1.72	1.73	1.85	1.92	2.00	2.08	2.23	2.31	2.47	2.92	3.38*
	10	2.04	2.06	2.21	2.30	2.39	2.48	2.67	2.76	2.95	3.50	4.07*
	20	2.46	2.50	2.69	2.80	2.92	3.03	3.27	3.39	3.63	4.35	5.10*
	30	2.77	2.82	3.05	3.18	3.32	3.46	3.73	3.87	4.16	5.02	5.94*
	40	3.02	3.09	3.35	3.50	3.66	3.81	4.13	4.29	4.62	5.62	6.70*
	60	3.44	3.53	3.86	4.04	4.23	4.42	4.81	5.01	5.42	6.69	8.08*
	70	3.62	3.73	4.08	4.27	4.48	4.69	5.11	5.33	5.78	7.19	8.73*
	80	3.78	3.90	4.28	4.50	4.72	4.94	5.40	5.64	6.13	7.67	9.35*
250	5	1.81	1.82	1.95	2.02	2.10	2.18	2.34	2.42	2.58	3.05	3.52*
	10	2.15	2.18	2.33	2.42	2.52	2.61	2.81	2.90	3.10	3.67	4.25*
	20	2.61	2.65	2.85	2.96	3.08	3.20	3.45	3.57	3.81	4.55	5.31*
	30	2.94	3.00	3.23	3.37	3.51	3.65	3.94	4.08	4.37	5.25	6.17*
	40	3.22	3.29	3.55	3.71	3.86	4.02	4.35	4.51	4.84	5.86	6.94*
	60	3.66	3.76	4.09	4.27	4.46	4.66	5.06	5.26	5.67	6.94	8.33*
	70	3.86	3.96	4.32	4.52	4.73	4.94	5.37	5.59	6.04	7.44	8.97*
	80	4.03	4.15	4.54	4.75	4.97	5.20	5.67	5.91	6.39	7.92	9.60*
300	5	1.88	1.90	2.03	2.11	2.19	2.27	2.44	2.52	2.68	3.17	3.65*
	10	2.25	2.28	2.44	2.53	2.63	2.73	2.93	3.03	3.23	3.81	4.41*
	20	2.74	2.78	2.99	3.11	3.23	3.35	3.60	3.73	3.98	4.73	5.51*
	30	3.10	3.15	3.39	3.53	3.68	3.82	4.11	4.26	4.56	5.45	6.39*
	40	3.39	3.46	3.73	3.89	4.05	4.21	4.55	4.71	5.05	6.08	7.17*
	60	3.86	3.96	4.29	4.48	4.68	4.87	5.28	5.48	5.90	7.18	8.56*
	70	4.06	4.17	4.54	4.74	4.95	5.16	5.60	5.82	6.28	7.68	9.21*
	80	4.25	4.37	4.76	4.98	5.21	5.44	5.91	6.15	6.64	8.16	9.83*
400	5	2.02	2.04	2.17	2.26	2.34	2.43	2.60	2.69	2.86	3.36	3.87*
	10	2.43	2.46	2.63	2.73	2.83	2.93	3.14	3.25	3.46	4.07	4.69*
	20	2.97	3.01	3.23	3.35	3.48	3.61	3.88	4.01	4.27	5.05	5.86*
	30	3.36	3.42	3.67	3.82	3.97	4.12	4.43	4.58	4.89	5.81	6.77*
	40	3.68	3.75	4.04	4.20	4.37	4.54	4.89	5.06	5.41	6.46	7.58*
	60	4.20	4.30	4.65	4.84	5.05	5.25	5.67	5.90	6.30	7.60	8.99*
	70	4.42	4.53	4.91	5.12	5.34	5.56	6.01	6.24	6.70	8.12	9.65*
	80	4.63	4.75	5.15	5.38	5.61	5.85	6.33	6.58	7.07	8.61	10.27*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.0 m (RADIUS = 6.4 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
0	5	1.14	1.21	1.40	1.51	1.62	1.73	1.95	2.06	2.28	2.96	3.65*
	10	1.32	1.44	1.72	1.87	2.02	2.17	2.47	2.62	2.93	3.86	4.82*
	20	1.62	1.82	2.25	2.47	2.68	2.90	3.34	3.56	4.01	5.38	6.79*
	30	1.88	2.16	2.72	2.99	3.27	3.55	4.11	4.39	4.96	6.71	8.52*
	40	2.12	2.47	3.15	3.48	3.81	4.14	4.81	5.15	5.83	7.93	10.11*
	60	2.56	3.04	3.93	4.36	4.80	5.23	6.10	6.54	7.43	10.17	13.02*
	70	2.77	3.31	4.30	4.78	5.26	5.74	6.70	7.19	8.18	11.21	14.38*
	80	2.97	3.56	4.65	5.18	5.70	6.23	7.29	7.82	8.90	12.22	15.69*
10	5	1.46	1.48	1.63	1.72	1.82	1.91	2.11	2.22	2.43	3.08	3.75*
	10	1.66	1.72	1.94	2.06	2.19	2.33	2.61	2.76	3.05	3.96	4.91*
	20	1.97	2.09	2.44	2.64	2.84	3.04	3.46	3.68	4.11	5.46	6.86*
	30	2.23	2.41	2.89	3.15	3.41	3.68	4.22	4.50	5.05	6.78	8.59*
	40	2.46	2.71	3.31	3.62	3.94	4.26	4.92	5.25	5.92	8.00	10.17*
	60	2.88	3.26	4.08	4.49	4.91	5.34	6.20	6.63	7.51	10.23	13.07*
	70	3.07	3.52	4.44	4.90	5.37	5.84	6.79	7.28	8.25	11.27	14.43*
	80	3.26	3.77	4.79	5.30	5.81	6.33	7.37	7.90	8.97	12.28	15.74*
20	5	1.60	1.63	1.78	1.87	1.96	2.06	2.25	2.35	2.56	3.19	3.85*
	10	1.85	1.90	2.10	2.22	2.35	2.48	2.75	2.89	3.17	4.06	4.99*
	20	2.20	2.30	2.62	2.80	2.99	3.18	3.59	3.79	4.22	5.55	6.94*
	30	2.48	2.63	3.06	3.30	3.55	3.80	4.33	4.60	5.15	6.86	8.65*
	40	2.72	2.93	3.47	3.76	4.07	4.38	5.02	5.35	6.01	8.07	10.23*
	60	3.15	3.47	4.22	4.62	5.03	5.45	6.29	6.72	7.59	10.29	13.13*
	70	3.34	3.72	4.58	5.03	5.48	5.95	6.88	7.36	8.33	11.34	14.48*
	80	3.53	3.96	4.92	5.42	5.92	6.43	7.46	7.98	9.04	12.34	15.79*
50	5	1.87	1.89	2.05	2.14	2.24	2.34	2.54	2.65	2.85	3.48	4.13*
	10	2.19	2.24	2.44	2.56	2.69	2.82	3.08	3.21	3.49	4.34	5.24*
	20	2.63	2.71	3.01	3.18	3.36	3.54	3.92	4.12	4.52	5.79	7.15*
	30	2.97	3.09	3.48	3.69	3.92	4.16	4.65	4.90	5.43	7.08	8.85*
	40	3.25	3.41	3.89	4.16	4.43	4.72	5.32	5.63	6.27	8.28	10.42*
	60	3.73	3.98	4.64	5.00	5.37	5.76	6.57	6.98	7.83	10.48	13.29*
	70	3.95	4.24	4.98	5.39	5.82	6.25	7.15	7.61	8.56	11.52	14.64*
	80	4.15	4.49	5.32	5.77	6.24	6.73	7.72	8.23	9.27	12.52	15.95*
100	5	2.15	2.17	2.34	2.44	2.54	2.65	2.86	2.97	3.19	3.83	4.50*
	10	2.55	2.59	2.81	2.93	3.06	3.20	3.47	3.61	3.88	4.73	5.63*
	20	3.09	3.16	3.47	3.64	3.81	4.00	4.37	4.56	4.95	6.18	7.51*
	30	3.49	3.60	3.98	4.19	4.42	4.64	5.12	5.36	5.86	7.45	9.17*
	40	3.82	3.97	4.43	4.68	4.95	5.22	5.79	6.08	6.69	8.62	10.72*
	60	4.39	4.60	5.21	5.54	5.89	6.25	7.01	7.40	8.21	10.80	13.57*
	70	4.63	4.88	5.56	5.94	6.33	6.74	7.59	8.03	8.93	11.82	14.91*
	80	4.86	5.15	5.90	6.32	6.75	7.20	8.14	8.63	9.63	12.81	16.20*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.0 m (RADIUS = 6.4 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 (m*s) ^{1/2}	5	2.35	2.37	2.55	2.65	2.76	2.87	3.10	3.21	3.44	4.10	4.79*	
	10	2.80	2.85	3.08	3.21	3.34	3.48	3.76	3.91	4.19	5.06	5.96*	
	20	3.42	3.49	3.80	3.98	4.16	4.35	4.73	4.92	5.31	6.53	7.84*	
	30	3.87	3.98	4.36	4.58	4.80	5.03	5.50	5.74	6.24	7.80	9.49*	
	40	4.24	4.39	4.84	5.10	5.36	5.63	6.19	6.48	7.07	8.96	11.02*	
	60	4.87	5.07	5.67	5.99	6.34	6.69	7.42	7.80	8.59	11.11	13.84*	
	70	5.14	5.38	6.04	6.40	6.78	7.17	7.99	8.42	9.30	12.12	15.17*	
	80	5.39	5.66	6.39	6.79	7.21	7.64	8.55	9.02	9.99	13.10	16.46*	
200	5	2.51	2.53	2.72	2.83	2.94	3.06	3.29	3.41	3.64	4.33	5.03*	
	10	3.01	3.06	3.29	3.43	3.57	3.72	4.01	4.15	4.45	5.33	6.25*	
	20	3.68	3.76	4.08	4.26	4.45	4.64	5.03	5.22	5.62	6.85	8.16*	
	30	4.18	4.29	4.68	4.90	5.13	5.36	5.84	6.08	6.57	8.12	9.80*	
	40	4.59	4.73	5.19	5.44	5.71	5.98	6.54	6.83	7.42	9.28	11.31*	
	60	5.26	5.46	6.05	6.38	6.72	7.07	7.80	8.17	8.94	11.41	14.12*	
	70	5.56	5.78	6.44	6.80	7.18	7.56	8.37	8.79	9.65	12.42	15.44*	
	80	5.83	6.09	6.80	7.20	7.61	8.04	8.92	9.38	10.33	13.39	16.72*	
250	5	2.65	2.67	2.87	2.98	3.10	3.22	3.46	3.58	3.82	4.52	5.25*	
	10	3.19	3.24	3.48	3.62	3.77	3.92	4.22	4.37	4.67	5.57	6.51*	
	20	3.91	3.99	4.32	4.51	4.70	4.89	5.29	5.49	5.89	7.13	8.44*	
	30	4.44	4.55	4.95	5.18	5.41	5.65	6.13	6.37	6.87	8.42	10.09*	
	40	4.88	5.02	5.49	5.75	6.02	6.29	6.86	7.15	7.73	9.58	11.60*	
	60	5.60	5.80	6.39	6.72	7.06	7.41	8.14	8.51	9.27	11.71	14.39*	
	70	5.92	6.14	6.79	7.16	7.53	7.92	8.72	9.13	9.98	12.71	15.70*	
	80	6.20	6.46	7.17	7.57	7.98	8.40	9.28	9.73	10.66	13.67	16.97*	
300	5	2.77	2.80	2.99	3.11	3.23	3.35	3.60	3.73	3.97	4.70	5.44*	
	10	3.35	3.40	3.65	3.79	3.94	4.09	4.40	4.56	4.87	5.79	6.74*	
	20	4.11	4.20	4.53	4.72	4.92	5.12	5.52	5.73	6.14	7.39	8.71*	
	30	4.68	4.79	5.20	5.43	5.66	5.90	6.39	6.64	7.14	8.70	10.37*	
	40	5.14	5.28	5.76	6.02	6.29	6.57	7.14	7.43	8.02	9.87	11.88*	
	60	5.90	6.10	6.70	7.03	7.37	7.72	8.45	8.82	9.58	12.00	14.65*	
	70	6.23	6.45	7.11	7.48	7.85	8.24	9.04	9.45	10.29	12.99	15.96*	
	80	6.54	6.78	7.50	7.90	8.31	8.73	9.60	10.05	10.98	13.95	17.22*	
400	5	2.98	3.01	3.22	3.34	3.47	3.60	3.85	3.98	4.24	5.00	5.77*	
	10	3.62	3.67	3.93	4.09	4.24	4.40	4.73	4.89	5.21	6.16	7.15*	
	20	4.46	4.55	4.90	5.10	5.30	5.51	5.93	6.14	6.57	7.85	9.20*	
	30	5.08	5.20	5.62	5.86	6.10	6.35	6.86	7.11	7.63	9.20	10.89*	
	40	5.59	5.73	6.22	6.50	6.78	7.06	7.65	7.94	8.54	10.40	12.40*	
	60	6.43	6.62	7.23	7.57	7.92	8.28	9.01	9.38	10.14	12.54	15.17*	
	70	6.78	7.00	7.67	8.04	8.42	8.81	9.62	10.03	10.87	13.53	16.46*	
	80	7.11	7.36	8.08	8.48	8.90	9.32	10.20	10.64	11.56	14.49	17.72*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.0 m (RADIUS = 6.4 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
	5	1.68	1.82	2.17	2.35	2.53	2.72	3.09	3.28	3.65	4.81	5.98*	
	10	2.04	2.28	2.80	3.06	3.33	3.59	4.13	4.40	4.94	6.61	8.33*	
	20	2.64	3.05	3.86	4.26	4.67	5.07	5.88	6.29	7.11	9.64	12.27*	
	30	3.16	3.73	4.80	5.32	5.84	6.36	7.41	7.94	9.01	12.30	15.73*	
	40	3.64	4.35	5.65	6.29	6.92	7.55	8.82	9.46	10.75	14.75	18.91*	
	60	4.52	5.49	7.22	8.06	8.89	9.72	11.40	12.24	13.95	19.22	24.72*	
	70	4.93	6.02	7.95	8.88	9.81	10.74	12.60	13.54	15.44	21.31	27.44*	
80	5.33	6.53	8.66	9.68	10.70	11.72	13.76	14.80	16.88	23.33	30.06*		
10	5	2.09	2.16	2.43	2.58	2.74	2.91	3.26	3.44	3.80	4.92	6.08*	
	10	2.46	2.60	3.03	3.27	3.51	3.76	4.27	4.54	5.07	6.71	8.41*	
	20	3.04	3.34	4.06	4.44	4.82	5.21	6.00	6.40	7.21	9.73	12.34*	
	30	3.53	3.99	4.97	5.47	5.98	6.49	7.52	8.04	9.10	12.38	15.80*	
	40	3.99	4.59	5.82	6.43	7.05	7.67	8.92	9.56	10.84	14.82	18.97*	
	60	4.84	5.71	7.37	8.19	9.01	9.83	11.49	12.33	14.03	19.29	24.78*	
	70	5.24	6.23	8.10	9.01	9.93	10.84	12.69	13.63	15.52	21.37	27.50*	
	80	5.63	6.74	8.80	9.81	10.81	11.82	13.85	14.88	16.96	23.39	30.12*	
20	5	2.31	2.37	2.62	2.77	2.93	3.09	3.42	3.59	3.94	5.04	6.19*	
	10	2.73	2.85	3.23	3.46	3.69	3.92	4.42	4.67	5.19	6.81	8.50*	
	20	3.35	3.59	4.25	4.60	4.97	5.35	6.12	6.52	7.32	9.81	12.42*	
	30	3.86	4.23	5.15	5.63	6.12	6.62	7.63	8.15	9.20	12.46	15.86*	
	40	4.31	4.83	5.98	6.57	7.18	7.79	9.03	9.65	10.93	14.89	19.03*	
	60	5.15	5.92	7.52	8.32	9.13	9.94	11.58	12.42	14.11	19.35	24.83*	
	70	5.54	6.44	8.24	9.14	10.04	10.95	12.78	13.71	15.59	21.44	27.55*	
	80	5.92	6.94	8.94	9.93	10.92	11.92	13.94	14.96	17.03	23.45	30.17*	
50	5	2.72	2.77	3.03	3.18	3.33	3.49	3.82	3.98	4.32	5.37	6.49*	
	10	3.24	3.34	3.71	3.91	4.13	4.35	4.82	5.06	5.55	7.10	8.76*	
	20	3.98	4.17	4.75	5.07	5.41	5.76	6.48	6.86	7.63	10.06	12.64*	
	30	4.55	4.85	5.64	6.07	6.53	6.99	7.96	8.46	9.48	12.68	16.06*	
	40	5.05	5.45	6.45	7.00	7.56	8.14	9.33	9.95	11.19	15.10	19.21*	
	60	5.93	6.53	7.95	8.70	9.48	10.26	11.86	12.68	14.35	19.54	25.00*	
	70	6.32	7.04	8.66	9.51	10.38	11.26	13.05	13.97	15.83	21.62	27.71*	
	80	6.71	7.53	9.34	10.29	11.25	12.22	14.20	15.21	17.25	23.63	30.32*	
100	5	3.14	3.19	3.46	3.62	3.78	3.94	4.28	4.45	4.79	5.84	6.95*	
	10	3.78	3.88	4.24	4.45	4.67	4.89	5.35	5.59	6.06	7.56	9.18*	
	20	4.66	4.84	5.39	5.69	6.02	6.35	7.04	7.39	8.13	10.47	13.00*	
	30	5.33	5.59	6.31	6.72	7.14	7.58	8.49	8.97	9.94	13.05	16.39*	
	40	5.90	6.24	7.14	7.64	8.16	8.71	9.84	10.42	11.63	15.45	19.52*	
	60	6.87	7.37	8.63	9.32	10.04	10.79	12.33	13.12	14.74	19.86	25.28*	
	70	7.30	7.89	9.33	10.11	10.93	11.77	13.50	14.39	16.21	21.92	27.98*	
	80	7.70	8.38	10.00	10.88	11.78	12.72	14.63	15.62	17.62	23.92	30.58*	

SPACING = 9.0 m (RADIUS = 6.4 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	3.45	3.50	3.78	3.94	4.11	4.28	4.63	4.81	5.16	6.23	7.34*
	10	4.18	4.27	4.65	4.86	5.08	5.31	5.78	6.01	6.49	7.98	9.58*
	20	5.16	5.33	5.88	6.19	6.51	6.84	7.52	7.87	8.58	10.87	13.36*
	30	5.90	6.15	6.86	7.26	7.67	8.09	8.98	9.44	10.39	13.42	16.72*
	40	6.53	6.84	7.72	8.20	8.71	9.23	10.32	10.88	12.05	15.79	19.83*
	60	7.58	8.04	9.24	9.90	10.58	11.29	12.78	13.55	15.13	20.17	25.56*
	70	8.04	8.58	9.94	10.68	11.46	12.26	13.94	14.80	16.58	22.23	28.24*
	80	8.48	9.09	10.61	11.44	12.31	13.20	15.06	16.02	17.99	24.22	30.84*
200	5	3.70	3.75	4.04	4.21	4.38	4.56	4.92	5.10	5.46	6.55	7.68*
	10	4.49	4.59	4.98	5.20	5.43	5.66	6.13	6.37	6.86	8.35	9.95*
	20	5.57	5.74	6.29	6.60	6.93	7.26	7.94	8.28	9.00	11.25	13.71*
	30	6.37	6.61	7.32	7.72	8.13	8.55	9.42	9.88	10.81	13.78	17.04*
	40	7.05	7.35	8.21	8.69	9.19	9.70	10.77	11.32	12.46	16.14	20.13*
	60	8.17	8.61	9.77	10.41	11.08	11.77	13.22	13.97	15.52	20.48	25.83*
	70	8.66	9.17	10.48	11.20	11.96	12.74	14.37	15.21	16.96	22.53	28.51*
	80	9.13	9.70	11.16	11.96	12.80	13.67	15.48	16.42	18.35	24.51	31.10*
250	5	3.91	3.96	4.26	4.44	4.62	4.80	5.17	5.35	5.73	6.84	7.99*
	10	4.77	4.86	5.26	5.49	5.72	5.96	6.44	6.69	7.18	8.69	10.29*
	20	5.92	6.09	6.65	6.96	7.29	7.63	8.31	8.66	9.37	11.61	14.05*
	30	6.78	7.01	7.73	8.12	8.53	8.96	9.83	10.28	11.20	14.14	17.36*
	40	7.49	7.79	8.65	9.13	9.62	10.13	11.18	11.73	12.86	16.47	20.43*
	60	8.68	9.11	10.25	10.88	11.54	12.22	13.64	14.37	15.90	20.79	26.11*
	70	9.20	9.69	10.98	11.69	12.42	13.19	14.78	15.61	17.33	22.83	28.77*
	80	9.69	10.24	11.67	12.45	13.27	14.12	15.89	16.81	18.71	24.80	31.36*
300	5	4.10	4.15	4.46	4.64	4.82	5.01	5.39	5.58	5.96	7.09	8.27*
	10	5.01	5.10	5.51	5.74	5.98	6.23	6.72	6.97	7.47	9.00	10.61*
	20	6.23	6.40	6.97	7.29	7.62	7.96	8.65	9.00	9.72	11.95	14.38*
	30	7.14	7.37	8.09	8.49	8.90	9.33	10.20	10.65	11.57	14.48	17.67*
	40	7.89	8.18	9.04	9.52	10.01	10.52	11.57	12.12	13.23	16.80	20.73*
	60	9.14	9.55	10.69	11.32	11.97	12.64	14.04	14.76	16.27	21.10	26.38*
	70	9.68	10.16	11.43	12.13	12.86	13.61	15.18	16.00	17.69	23.13	29.04*
	80	10.19	10.73	12.13	12.91	13.71	14.54	16.29	17.19	19.07	25.09	31.61*
400	5	4.42	4.48	4.80	4.99	5.18	5.38	5.77	5.97	6.37	7.54	8.76*
	10	5.42	5.52	5.95	6.19	6.44	6.69	7.21	7.47	7.98	9.55	11.19*
	20	6.77	6.93	7.52	7.85	8.19	8.54	9.25	9.61	10.33	12.58	15.00*
	30	7.76	7.99	8.72	9.13	9.55	9.98	10.87	11.32	12.23	15.12	18.29*
	40	8.58	8.86	9.74	10.22	10.72	11.23	12.28	12.82	13.93	17.44	21.32*
	60	9.93	10.33	11.47	12.09	12.74	13.40	14.78	15.50	16.97	21.71	26.92*
	70	10.51	10.98	12.24	12.93	13.65	14.39	15.94	16.74	18.39	23.72	29.56*
	80	11.06	11.58	12.97	13.73	14.52	15.34	17.04	17.93	19.76	25.66	32.12*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.0 m (RADIUS = 6.4 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	5	2.58	2.86	3.49	3.81	4.13	4.46	5.11	5.44	6.11	8.14	10.23*	
	10	3.29	3.78	4.76	5.24	5.73	6.21	7.19	7.69	8.68	11.75	14.92*	
	20	4.48	5.32	6.88	7.64	8.40	9.16	10.69	11.46	13.02	17.82	22.81*	
	30	5.53	6.68	8.75	9.75	10.75	11.75	13.76	14.77	16.82	23.14	29.73*	
	40	6.49	7.92	10.46	11.69	12.90	14.12	16.57	17.81	20.31	28.03	36.08*	
	60	8.25	10.20	13.60	15.23	16.85	18.47	21.73	23.37	26.69	36.97	47.72*	
	70	9.08	11.26	15.06	16.88	18.69	20.50	24.14	25.97	29.68	41.16	53.15*	
	80	9.87	12.29	16.48	18.48	20.47	22.46	26.46	28.48	32.56	45.19	58.40*	
10	5	3.08	3.24	3.76	4.05	4.35	4.66	5.29	5.61	6.26	8.26	10.34*	
	10	3.76	4.12	4.99	5.45	5.91	6.38	7.34	7.83	8.81	11.85	15.01*	
	20	4.90	5.61	7.08	7.82	8.56	9.30	10.81	11.58	13.12	17.90	22.89*	
	30	5.91	6.94	8.92	9.91	10.89	11.88	13.87	14.87	16.91	23.22	29.80*	
	40	6.85	8.16	10.63	11.83	13.03	14.24	16.68	17.91	20.39	28.10	36.15*	
	60	8.58	10.42	13.75	15.36	16.97	18.58	21.82	23.46	26.77	37.04	47.77*	
	70	9.39	11.47	15.21	17.01	18.81	20.61	24.23	26.06	29.76	41.22	53.21*	
	80	10.17	12.49	16.61	18.60	20.58	22.56	26.55	28.56	32.64	45.25	58.45*	
20	5	3.40	3.54	4.01	4.28	4.56	4.85	5.46	5.77	6.40	8.38	10.44*	
	10	4.13	4.42	5.21	5.65	6.09	6.55	7.49	7.96	8.93	11.95	15.10*	
	20	5.28	5.89	7.27	7.99	8.71	9.45	10.94	11.69	13.23	17.99	22.96*	
	30	6.28	7.19	9.10	10.06	11.03	12.00	13.98	14.98	17.01	23.29	29.86*	
	40	7.20	8.40	10.79	11.98	13.17	14.36	16.78	18.00	20.48	28.17	36.21*	
	60	8.90	10.63	13.89	15.49	17.09	18.69	21.92	23.55	26.85	37.10	47.83*	
	70	9.70	11.68	15.35	17.14	18.92	20.71	24.32	26.14	29.84	41.28	53.26*	
	80	10.47	12.69	16.75	18.73	20.69	22.66	26.64	28.65	32.71	45.31	58.50*	
50	5	4.01	4.12	4.57	4.82	5.09	5.36	5.93	6.23	6.83	8.72	10.75*	
	10	4.88	5.11	5.81	6.20	6.61	7.03	7.91	8.37	9.30	12.25	15.36*	
	20	6.16	6.63	7.83	8.49	9.17	9.87	11.30	12.04	13.54	18.24	23.18*	
	30	7.20	7.92	9.62	10.52	11.45	12.39	14.31	15.29	17.29	23.52	30.06*	
	40	8.13	9.10	11.27	12.41	13.55	14.72	17.09	18.30	20.75	28.38	36.39*	
	60	9.80	11.28	14.34	15.88	17.44	19.01	22.20	23.82	27.09	37.29	48.00*	
	70	10.58	12.30	15.77	17.51	19.26	21.02	24.59	26.40	30.07	41.46	53.42*	
	80	11.34	13.30	17.17	19.09	21.02	22.97	26.90	28.89	32.93	45.49	58.66*	
100	5	4.65	4.76	5.21	5.47	5.73	6.01	6.57	6.86	7.44	9.28	11.25*	
	10	5.70	5.90	6.57	6.94	7.33	7.73	8.57	9.00	9.89	12.73	15.79*	
	20	7.16	7.56	8.65	9.26	9.89	10.54	11.90	12.61	14.06	18.65	23.55*	
	30	8.32	8.91	10.43	11.26	12.12	13.01	14.86	15.81	17.76	23.89	30.39*	
	40	9.31	10.12	12.06	13.11	14.19	15.31	17.60	18.78	21.19	28.73	36.70*	
	60	11.06	12.28	15.06	16.52	18.02	19.55	22.67	24.26	27.49	37.61	48.27*	
	70	11.86	13.29	16.47	18.13	19.82	21.54	25.04	26.82	30.45	41.77	53.69*	
	80	12.62	14.27	17.84	19.69	21.57	23.47	27.34	29.31	33.31	45.79	58.92*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.0 m (RADIUS = 6.4 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	5.12	5.23	5.69	5.95	6.22	6.50	7.07	7.36	7.95	9.77	11.72*
	10	6.29	6.49	7.15	7.53	7.92	8.32	9.14	9.57	10.44	13.20	16.21*
	20	7.92	8.29	9.34	9.92	10.53	11.16	12.47	13.16	14.56	19.06	23.91*
	30	9.17	9.71	11.15	11.94	12.76	13.62	15.40	16.32	18.23	24.27	30.72*
	40	10.24	10.96	12.78	13.77	14.81	15.88	18.11	19.26	21.62	29.08	37.01*
	60	12.08	13.17	15.76	17.15	18.60	20.08	23.13	24.69	27.89	37.93	48.55*
	70	12.91	14.19	17.16	18.75	20.38	22.05	25.49	27.25	30.83	42.07	53.96*
	80	13.69	15.16	18.51	20.29	22.11	23.96	27.77	29.71	33.68	46.08	59.18*
200	5	5.50	5.61	6.08	6.35	6.63	6.92	7.50	7.79	8.39	10.22	12.16*
	10	6.78	6.97	7.64	8.02	8.41	8.82	9.64	10.06	10.93	13.66	16.63*
	20	8.53	8.89	9.93	10.50	11.10	11.72	13.01	13.67	15.05	19.47	24.27*
	30	9.87	10.39	11.78	12.55	13.35	14.18	15.92	16.82	18.68	24.64	31.05*
	40	11.00	11.69	13.44	14.40	15.40	16.44	18.61	19.74	22.05	29.43	37.31*
	60	12.94	13.96	16.42	17.76	19.16	20.60	23.59	25.13	28.28	38.24	48.83*
	70	13.80	14.99	17.81	19.34	20.93	22.56	25.93	27.67	31.21	42.38	54.23*
	80	14.62	15.98	19.16	20.87	22.64	24.46	28.20	30.12	34.04	46.38	59.44*
250	5	5.82	5.93	6.42	6.69	6.98	7.27	7.87	8.17	8.77	10.62	12.57*
	10	7.19	7.39	8.07	8.45	8.85	9.25	10.09	10.51	11.37	14.09	17.04*
	20	9.06	9.41	10.45	11.02	11.62	12.23	13.50	14.16	15.52	19.87	24.63*
	30	10.48	10.98	12.35	13.11	13.90	14.72	16.42	17.31	19.13	25.01	31.38*
	40	11.67	12.33	14.04	14.98	15.96	16.97	19.10	20.20	22.48	29.77	37.62*
	60	13.69	14.66	17.04	18.35	19.71	21.11	24.04	25.56	28.68	38.56	49.11*
	70	14.59	15.72	18.44	19.92	21.46	23.06	26.37	28.08	31.59	42.68	54.49*
	80	15.43	16.72	19.78	21.44	23.17	24.94	28.63	30.53	34.41	46.67	59.70*
300	5	6.11	6.22	6.72	7.00	7.29	7.59	8.20	8.50	9.12	10.98	12.95*
	10	7.56	7.76	8.45	8.84	9.24	9.65	10.49	10.92	11.78	14.49	17.43*
	20	9.53	9.88	10.92	11.49	12.09	12.70	13.97	14.62	15.96	20.26	24.98*
	30	11.02	11.51	12.87	13.63	14.41	15.22	16.90	17.77	19.57	25.38	31.70*
	40	12.27	12.90	14.59	15.52	16.48	17.48	19.57	20.66	22.90	30.12	37.92*
	60	14.37	15.30	17.63	18.91	20.24	21.61	24.49	25.99	29.06	38.87	49.38*
	70	15.30	16.38	19.03	20.48	21.99	23.55	26.81	28.50	31.97	42.99	54.76*
	80	16.17	17.40	20.37	22.00	23.68	25.43	29.05	30.93	34.78	46.96	59.95*
400	5	6.60	6.72	7.23	7.53	7.84	8.15	8.78	9.09	9.73	11.63	13.64*
	10	8.20	8.39	9.11	9.51	9.92	10.34	11.20	11.64	12.52	15.24	18.17*
	20	10.35	10.69	11.74	12.32	12.92	13.54	14.81	15.46	16.79	21.03	25.68*
	30	11.96	12.44	13.80	14.55	15.33	16.13	17.78	18.64	20.41	26.10	32.35*
	40	13.30	13.92	15.58	16.49	17.44	18.43	20.47	21.53	23.73	30.80	38.53*
	60	15.55	16.44	18.70	19.94	21.23	22.57	25.37	26.83	29.84	39.50	49.94*
	70	16.54	17.56	20.12	21.52	22.98	24.50	27.67	29.31	32.71	43.59	55.29*
	80	17.46	18.62	21.48	23.04	24.67	26.36	29.89	31.73	35.50	47.55	60.47*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.5 m (RADIUS = 6.7 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
0	5	0.84	0.86	0.98	1.04	1.11	1.18	1.31	1.38	1.52	1.93	2.35*
	10	0.93	0.98	1.14	1.23	1.31	1.40	1.58	1.67	1.85	2.39	2.95*
	20	1.09	1.19	1.42	1.54	1.66	1.78	2.03	2.15	2.40	3.17	3.95*
	30	1.22	1.36	1.66	1.81	1.96	2.12	2.42	2.58	2.89	3.85	4.83*
	40	1.35	1.53	1.88	2.06	2.24	2.42	2.79	2.97	3.34	4.47	5.64*
	60	1.58	1.82	2.29	2.52	2.75	2.99	3.45	3.69	4.16	5.61	7.12*
	70	1.69	1.96	2.48	2.74	2.99	3.25	3.76	4.02	4.54	6.14	7.81*
	80	1.79	2.10	2.67	2.95	3.22	3.50	4.06	4.34	4.91	6.66	8.47*
10	5	1.08	1.08	1.17	1.22	1.28	1.34	1.47	1.53	1.66	2.05	2.45*
	10	1.20	1.22	1.34	1.41	1.48	1.56	1.72	1.80	1.97	2.49	3.03*
	20	1.39	1.43	1.61	1.71	1.81	1.92	2.15	2.27	2.51	3.25	4.02*
	30	1.53	1.60	1.84	1.97	2.11	2.25	2.54	2.69	2.99	3.92	4.90*
	40	1.66	1.76	2.05	2.21	2.37	2.54	2.89	3.07	3.43	4.54	5.70*
	60	1.88	2.04	2.44	2.66	2.87	3.10	3.55	3.78	4.24	5.68	7.17*
	70	1.98	2.17	2.63	2.87	3.11	3.35	3.85	4.11	4.62	6.21	7.86*
	80	2.08	2.30	2.81	3.07	3.33	3.60	4.15	4.43	4.99	6.72	8.53*
20	5	1.18	1.18	1.27	1.33	1.39	1.45	1.57	1.64	1.76	2.15	2.55*
	10	1.33	1.35	1.46	1.53	1.61	1.68	1.84	1.92	2.08	2.59	3.12*
	20	1.55	1.58	1.75	1.85	1.95	2.05	2.27	2.38	2.61	3.34	4.10*
	30	1.71	1.77	1.98	2.11	2.24	2.37	2.65	2.79	3.08	4.00	4.96*
	40	1.85	1.94	2.20	2.35	2.50	2.66	3.00	3.17	3.52	4.61	5.76*
	60	2.10	2.23	2.58	2.78	2.99	3.20	3.64	3.86	4.32	5.74	7.23*
	70	2.21	2.36	2.77	2.99	3.22	3.46	3.94	4.19	4.70	6.27	7.91*
	80	2.31	2.49	2.94	3.19	3.44	3.70	4.24	4.51	5.06	6.78	8.58*
50	5	1.36	1.36	1.46	1.52	1.58	1.65	1.78	1.85	1.98	2.38	2.78*
	10	1.57	1.58	1.70	1.77	1.85	1.93	2.09	2.17	2.34	2.84	3.35*
	20	1.85	1.88	2.04	2.14	2.24	2.34	2.55	2.66	2.88	3.58	4.31*
	30	2.05	2.10	2.31	2.43	2.55	2.68	2.94	3.07	3.35	4.22	5.16*
	40	2.23	2.30	2.54	2.68	2.82	2.97	3.28	3.44	3.77	4.82	5.94*
	60	2.52	2.63	2.94	3.12	3.31	3.51	3.91	4.12	4.56	5.93	7.39*
	70	2.65	2.77	3.13	3.33	3.54	3.76	4.21	4.44	4.93	6.45	8.07*
	80	2.77	2.91	3.31	3.53	3.76	4.00	4.50	4.75	5.28	6.96	8.73*
100	5	1.54	1.55	1.66	1.72	1.79	1.86	2.00	2.07	2.21	2.63	3.05*
	10	1.81	1.82	1.95	2.03	2.11	2.20	2.37	2.45	2.62	3.14	3.67*
	20	2.16	2.19	2.36	2.46	2.56	2.67	2.89	3.00	3.23	3.91	4.63*
	30	2.41	2.46	2.67	2.79	2.91	3.04	3.31	3.44	3.71	4.56	5.47*
	40	2.63	2.69	2.93	3.07	3.22	3.36	3.67	3.83	4.15	5.16	6.24*
	60	2.98	3.07	3.38	3.55	3.74	3.92	4.31	4.51	4.93	6.24	7.67*
	70	3.13	3.24	3.58	3.77	3.97	4.18	4.61	4.83	5.29	6.76	8.34*
	80	3.27	3.39	3.77	3.98	4.20	4.42	4.90	5.14	5.64	7.25	8.99*

SPACING = 9.5 m (RADIUS = 6.7 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 <													

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.5 m (RADIUS = 6.7 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m	1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}	°C												
0	5		1.20	1.26	1.45	1.56	1.67	1.78	2.00	2.11	2.33	3.01	3.70*
	10		1.38	1.50	1.78	1.93	2.08	2.23	2.53	2.69	2.99	3.93	4.89*
	20		1.70	1.90	2.34	2.55	2.77	2.99	3.43	3.66	4.10	5.48	6.90*
	30		1.97	2.26	2.82	3.10	3.38	3.66	4.22	4.51	5.08	6.84	8.65*
	40		2.23	2.58	3.27	3.60	3.94	4.27	4.95	5.29	5.97	8.08	10.27*
	60		2.69	3.18	4.08	4.52	4.96	5.40	6.28	6.72	7.61	10.37	13.23*
	70		2.90	3.46	4.46	4.95	5.44	5.92	6.90	7.39	8.38	11.43	14.61*
	80		3.11	3.73	4.83	5.37	5.90	6.43	7.50	8.03	9.12	12.46	15.94*
10	5		1.52	1.54	1.69	1.78	1.87	1.97	2.17	2.27	2.48	3.13	3.80*
	10		1.74	1.79	2.00	2.13	2.26	2.40	2.68	2.83	3.12	4.03	4.98*
	20		2.06	2.18	2.53	2.73	2.93	3.14	3.56	3.77	4.21	5.56	6.97*
	30		2.33	2.52	3.00	3.26	3.52	3.79	4.34	4.61	5.18	6.91	8.72*
	40		2.57	2.83	3.43	3.75	4.07	4.40	5.05	5.39	6.06	8.16	10.33*
	60		3.01	3.40	4.23	4.66	5.08	5.51	6.37	6.81	7.69	10.43	13.28*
	70		3.22	3.67	4.61	5.08	5.55	6.03	6.99	7.47	8.46	11.50	14.66*
	80		3.42	3.93	4.97	5.49	6.01	6.53	7.58	8.12	9.19	12.52	16.00*
20	5		1.67	1.69	1.84	1.92	2.02	2.11	2.31	2.41	2.61	3.24	3.90*
	10		1.93	1.97	2.18	2.30	2.42	2.55	2.82	2.96	3.24	4.13	5.06*
	20		2.30	2.39	2.71	2.89	3.08	3.28	3.68	3.89	4.32	5.65	7.04*
	30		2.58	2.74	3.17	3.41	3.66	3.92	4.45	4.72	5.27	6.99	8.79*
	40		2.84	3.05	3.59	3.89	4.20	4.52	5.16	5.49	6.15	8.23	10.39*
	60		3.29	3.61	4.38	4.79	5.20	5.62	6.47	6.90	7.78	10.50	13.34*
	70		3.49	3.88	4.75	5.21	5.67	6.13	7.08	7.56	8.54	11.56	14.72*
	80		3.69	4.13	5.11	5.61	6.12	6.63	7.67	8.20	9.27	12.58	16.05*
50	5		1.95	1.97	2.12	2.21	2.31	2.41	2.61	2.71	2.91	3.54	4.18*
	10		2.29	2.32	2.52	2.64	2.77	2.89	3.16	3.29	3.56	4.42	5.32*
	20		2.74	2.82	3.12	3.28	3.46	3.64	4.02	4.22	4.62	5.90	7.26*
	30		3.09	3.21	3.60	3.82	4.04	4.28	4.77	5.03	5.55	7.22	8.98*
	40		3.39	3.55	4.03	4.29	4.57	4.86	5.47	5.78	6.42	8.44	10.58*
	60		3.89	4.14	4.80	5.17	5.55	5.94	6.75	7.17	8.02	10.69	13.51*
	70		4.12	4.41	5.16	5.58	6.01	6.45	7.35	7.82	8.77	11.74	14.88*
	80		4.33	4.67	5.51	5.97	6.45	6.94	7.94	8.45	9.50	12.76	16.20*
100	5		2.24	2.26	2.42	2.51	2.62	2.72	2.93	3.04	3.26	3.90	4.55*
	10		2.65	2.69	2.90	3.03	3.15	3.29	3.56	3.69	3.97	4.82	5.70*
	20		3.21	3.29	3.58	3.75	3.93	4.11	4.48	4.68	5.07	6.30	7.61*
	30		3.63	3.74	4.12	4.33	4.55	4.78	5.25	5.49	5.99	7.59	9.31*
	40		3.98	4.13	4.58	4.83	5.10	5.37	5.94	6.24	6.84	8.79	10.88*
	60		4.57	4.78	5.39	5.72	6.08	6.44	7.20	7.60	8.41	11.01	13.78*
	70		4.83	5.07	5.76	6.13	6.53	6.94	7.79	8.24	9.15	12.05	15.14*
	80		5.07	5.35	6.11	6.53	6.97	7.42	8.37	8.86	9.87	13.06	16.46*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.5 m (RADIUS = 6.7 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TEMPERATURE
 TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	2.45	2.46	2.63	2.74	2.84	2.95	3.18	3.29	3.51	4.18	4.85*
	10	2.92	2.96	3.18	3.31	3.44	3.58	3.86	4.00	4.28	5.15	6.04*
	20	3.56	3.63	3.93	4.10	4.28	4.47	4.85	5.04	5.43	6.65	7.95*
	30	4.03	4.13	4.51	4.72	4.95	5.18	5.65	5.89	6.38	7.94	9.63*
	40	4.42	4.56	5.00	5.26	5.52	5.79	6.35	6.64	7.24	9.13	11.18*
	60	5.07	5.27	5.86	6.19	6.53	6.88	7.62	8.00	8.79	11.32	14.06*
	70	5.35	5.58	6.24	6.61	6.99	7.39	8.21	8.64	9.52	12.36	15.41*
	80	5.62	5.88	6.61	7.01	7.43	7.87	8.78	9.25	10.23	13.36	16.72*
200	5	2.61	2.63	2.81	2.92	3.03	3.14	3.37	3.49	3.72	4.41	5.09*
	10	3.14	3.17	3.40	3.54	3.68	3.82	4.11	4.25	4.55	5.43	6.33*
	20	3.83	3.91	4.22	4.39	4.58	4.77	5.16	5.35	5.75	6.97	8.26*
	30	4.35	4.45	4.84	5.05	5.28	5.51	5.99	6.23	6.72	8.27	9.93*
	40	4.78	4.91	5.36	5.62	5.88	6.15	6.71	7.00	7.59	9.46	11.48*
	60	5.48	5.67	6.26	6.59	6.93	7.28	8.00	8.38	9.15	11.63	14.33*
	70	5.78	6.01	6.66	7.02	7.40	7.79	8.60	9.01	9.88	12.66	15.67*
	80	6.07	6.32	7.04	7.43	7.85	8.27	9.17	9.63	10.58	13.65	16.97*
250	5	2.76	2.78	2.96	3.07	3.19	3.30	3.54	3.66	3.90	4.60	5.31*
	10	3.32	3.36	3.60	3.73	3.88	4.02	4.32	4.47	4.77	5.67	6.59*
	20	4.07	4.14	4.46	4.65	4.84	5.03	5.42	5.62	6.03	7.26	8.55*
	30	4.62	4.73	5.12	5.34	5.57	5.81	6.29	6.53	7.03	8.58	10.23*
	40	5.08	5.21	5.67	5.93	6.20	6.47	7.04	7.32	7.91	9.76	11.76*
	60	5.83	6.02	6.61	6.94	7.28	7.63	8.35	8.72	9.49	11.93	14.60*
	70	6.16	6.37	7.02	7.38	7.76	8.15	8.95	9.36	10.22	12.95	15.93*
	80	6.46	6.70	7.41	7.81	8.22	8.64	9.52	9.98	10.92	13.94	17.23*
300	5	2.88	2.90	3.09	3.21	3.33	3.45	3.69	3.81	4.06	4.78	5.50*
	10	3.48	3.52	3.77	3.91	4.06	4.21	4.51	4.67	4.97	5.89	6.82*
	20	4.28	4.35	4.68	4.87	5.06	5.26	5.66	5.87	6.28	7.52	8.83*
	30	4.87	4.97	5.37	5.60	5.83	6.07	6.56	6.81	7.31	8.86	10.51*
	40	5.35	5.48	5.95	6.21	6.48	6.76	7.33	7.62	8.21	10.06	12.04*
	60	6.14	6.33	6.92	7.25	7.59	7.95	8.67	9.04	9.80	12.23	14.86*
	70	6.49	6.70	7.35	7.71	8.09	8.48	9.28	9.69	10.54	13.24	16.19*
	80	6.80	7.04	7.75	8.15	8.56	8.98	9.86	10.31	11.24	14.22	17.48*
400	5	3.10	3.12	3.32	3.44	3.57	3.69	3.95	4.08	4.33	5.09	5.84*
	10	3.77	3.81	4.06	4.21	4.37	4.52	4.84	5.00	5.32	6.28	7.24*
	20	4.65	4.72	5.06	5.25	5.46	5.66	6.08	6.29	6.72	7.99	9.32*
	30	5.29	5.39	5.80	6.04	6.28	6.53	7.03	7.29	7.80	9.37	11.03*
	40	5.82	5.95	6.43	6.70	6.98	7.26	7.84	8.14	8.74	10.59	12.57*
	60	6.68	6.87	7.47	7.81	8.15	8.51	9.24	9.62	10.38	12.78	15.38*
	70	7.06	7.27	7.93	8.29	8.68	9.07	9.87	10.28	11.12	13.79	16.70*
	80	7.40	7.63	8.35	8.75	9.17	9.59	10.47	10.91	11.84	14.77	17.97*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.5 m (RADIUS = 6.7 m)³
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
0	5	1.77	1.90	2.25	2.43	2.61	2.80	3.17	3.36	3.74	4.89	6.07*	
	10	2.14	2.38	2.91	3.17	3.44	3.70	4.24	4.51	5.06	6.73	8.45*	
	20	2.77	3.19	4.01	4.42	4.82	5.23	6.04	6.45	7.28	9.83	12.47*	
	30	3.32	3.90	4.98	5.51	6.04	6.56	7.62	8.15	9.23	12.54	15.98*	
	40	3.82	4.55	5.87	6.51	7.15	7.79	9.07	9.72	11.02	15.04	19.21*	
	60	4.75	5.74	7.50	8.35	9.19	10.04	11.73	12.58	14.30	19.60	25.13*	
	70	5.18	6.30	8.27	9.21	10.15	11.09	12.97	13.92	15.83	21.74	27.89*	
	80	5.60	6.83	9.00	10.04	11.07	12.10	14.17	15.21	17.31	23.80	30.56*	
10	5	2.19	2.25	2.51	2.67	2.83	3.00	3.35	3.52	3.89	5.01	6.17*	
	10	2.57	2.71	3.14	3.38	3.62	3.87	4.39	4.65	5.19	6.83	8.54*	
	20	3.18	3.48	4.21	4.59	4.98	5.37	6.17	6.57	7.39	9.91	12.54*	
	30	3.70	4.16	5.16	5.67	6.18	6.69	7.74	8.26	9.33	12.62	16.05*	
	40	4.18	4.80	6.04	6.66	7.29	7.91	9.18	9.82	11.11	15.11	19.28*	
	60	5.08	5.96	7.65	8.49	9.32	10.15	11.82	12.67	14.38	19.67	25.19*	
	70	5.50	6.51	8.41	9.34	10.27	11.19	13.06	14.00	15.91	21.80	27.95*	
	80	5.90	7.04	9.14	10.16	11.18	12.20	14.26	15.29	17.39	23.86	30.61*	
20	5	2.42	2.46	2.71	2.86	3.02	3.18	3.51	3.68	4.03	5.13	6.27*	
	10	2.85	2.96	3.35	3.57	3.80	4.04	4.54	4.79	5.31	6.93	8.63*	
	20	3.50	3.74	4.40	4.76	5.13	5.51	6.29	6.69	7.50	10.00	12.61*	
	30	4.03	4.41	5.34	5.82	6.32	6.82	7.85	8.37	9.42	12.70	16.12*	
	40	4.51	5.03	6.20	6.81	7.42	8.03	9.28	9.92	11.20	15.18	19.34*	
	60	5.39	6.18	7.81	8.62	9.44	10.26	11.92	12.76	14.46	19.73	25.24*	
	70	5.80	6.72	8.56	9.47	10.38	11.30	13.15	14.09	15.99	21.86	28.00*	
	80	6.20	7.25	9.28	10.29	11.30	12.31	14.34	15.38	17.46	23.92	30.67*	
50	5	2.84	2.88	3.13	3.28	3.43	3.59	3.91	4.08	4.42	5.47	6.58*	
	10	3.38	3.47	3.83	4.04	4.26	4.48	4.94	5.18	5.67	7.23	8.89*	
	20	4.15	4.34	4.91	5.24	5.58	5.93	6.66	7.04	7.81	10.25	12.83*	
	30	4.75	5.04	5.84	6.28	6.74	7.21	8.18	8.69	9.71	12.93	16.31*	
	40	5.27	5.67	6.68	7.24	7.81	8.39	9.60	10.21	11.47	15.40	19.52*	
	60	6.19	6.80	8.25	9.01	9.79	10.58	12.20	13.03	14.71	19.93	25.41*	
	70	6.60	7.33	8.98	9.85	10.72	11.61	13.43	14.35	16.22	22.05	28.16*	
	80	7.00	7.84	9.70	10.66	11.63	12.61	14.61	15.63	17.69	24.10	30.82*	
100	5	3.28	3.32	3.58	3.73	3.89	4.05	4.39	4.56	4.90	5.95	7.04*	
	10	3.94	4.03	4.39	4.59	4.81	5.03	5.49	5.72	6.20	7.70	9.31*	
	20	4.86	5.02	5.57	5.88	6.20	6.53	7.22	7.58	8.32	10.67	13.19*	
	30	5.55	5.80	6.53	6.94	7.36	7.80	8.72	9.20	10.18	13.31	16.64*	
	40	6.15	6.48	7.39	7.90	8.42	8.97	10.11	10.70	11.91	15.75	19.83*	
	60	7.16	7.66	8.94	9.64	10.37	11.12	12.67	13.47	15.11	20.25	25.69*	
	70	7.61	8.20	9.67	10.46	11.29	12.13	13.88	14.78	16.61	22.36	28.43*	
	80	8.03	8.72	10.37	11.26	12.17	13.11	15.05	16.04	18.06	24.40	31.08*	

SPACING = 9.5 m (RADIUS = 6.7 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 150	°C												
	5	3.59	3.64	3.90	4.06	4.23	4.40	4.75	4.92	5.27	6.34	7.43*	
	10	4.35	4.43	4.80	5.01	5.23	5.46	5.92	6.16	6.64	8.13	9.71*	
	20	5.38	5.54	6.08	6.39	6.70	7.03	7.71	8.06	8.78	11.07	13.55*	
	30	6.15	6.38	7.09	7.49	7.90	8.33	9.22	9.68	10.63	13.68	16.97*	
	40	6.80	7.11	7.98	8.47	8.98	9.50	10.60	11.17	12.34	16.10	20.13*	
	60	7.90	8.36	9.56	10.23	10.92	11.64	13.13	13.91	15.50	20.57	25.96*	
	70	8.38	8.92	10.29	11.04	11.83	12.64	14.33	15.20	16.99	22.67	28.70*	
	80	8.84	9.45	10.99	11.83	12.70	13.61	15.48	16.45	18.44	24.70	31.34*	
200	5	3.85	3.89	4.17	4.34	4.51	4.69	5.04	5.22	5.58	6.67	7.78*	
	10	4.68	4.76	5.14	5.36	5.59	5.82	6.29	6.53	7.01	8.51	10.08*	
	20	5.80	5.96	6.50	6.81	7.13	7.46	8.14	8.49	9.20	11.46	13.90*	
	30	6.64	6.86	7.57	7.96	8.37	8.80	9.67	10.13	11.06	14.05	17.29*	
	40	7.34	7.63	8.49	8.97	9.47	9.98	11.06	11.61	12.76	16.45	20.44*	
	60	8.51	8.95	10.11	10.76	11.43	12.12	13.58	14.34	15.90	20.89	26.24*	
	70	9.02	9.53	10.85	11.58	12.34	13.12	14.76	15.62	17.37	22.98	28.96*	
	80	9.50	10.08	11.56	12.37	13.21	14.09	15.91	16.86	18.81	25.00	31.60*	
250	5	4.07	4.11	4.40	4.57	4.75	4.93	5.30	5.48	5.85	6.96	8.09*	
	10	4.96	5.05	5.43	5.66	5.89	6.13	6.61	6.85	7.34	8.85	10.43*	
	20	6.16	6.32	6.87	7.18	7.51	7.84	8.53	8.87	9.59	11.83	14.24*	
	30	7.06	7.28	7.98	8.38	8.79	9.21	10.09	10.54	11.46	14.41	17.61*	
	40	7.80	8.09	8.94	9.42	9.91	10.42	11.48	12.03	13.16	16.79	20.74*	
	60	9.04	9.46	10.61	11.24	11.90	12.58	14.01	14.75	16.28	21.20	26.51*	
	70	9.58	10.07	11.36	12.07	12.81	13.58	15.19	16.02	17.75	23.28	29.23*	
	80	10.09	10.64	12.07	12.86	13.69	14.54	16.33	17.26	19.17	25.29	31.85*	
300	5	4.26	4.31	4.60	4.78	4.96	5.15	5.53	5.71	6.09	7.22	8.37*	
	10	5.21	5.30	5.69	5.92	6.16	6.40	6.89	7.14	7.64	9.16	10.75*	
	20	6.48	6.64	7.20	7.52	7.85	8.18	8.87	9.22	9.94	12.18	14.57*	
	30	7.43	7.65	8.36	8.76	9.17	9.59	10.47	10.92	11.84	14.76	17.93*	
	40	8.21	8.49	9.35	9.82	10.32	10.83	11.88	12.42	13.54	17.13	21.04*	
	60	9.51	9.92	11.06	11.68	12.34	13.01	14.42	15.15	16.66	21.52	26.79*	
	70	10.08	10.55	11.82	12.53	13.26	14.02	15.60	16.42	18.12	23.58	29.49*	
	80	10.60	11.14	12.55	13.33	14.14	14.98	16.73	17.65	19.53	25.59	32.11*	
400	5	4.60	4.65	4.96	5.14	5.33	5.53	5.92	6.12	6.51	7.68	8.86*	
	10	5.64	5.73	6.14	6.38	6.63	6.88	7.39	7.65	8.16	9.72	11.33*	
	20	7.04	7.19	7.77	8.10	8.44	8.78	9.49	9.84	10.57	12.81	15.20*	
	30	8.07	8.29	9.01	9.42	9.84	10.27	11.15	11.60	12.52	15.41	18.54*	
	40	8.92	9.20	10.06	10.54	11.04	11.55	12.60	13.14	14.25	17.78	21.63*	
	60	10.33	10.73	11.85	12.48	13.13	13.79	15.18	15.90	17.38	22.14	27.33*	
	70	10.94	11.39	12.65	13.35	14.07	14.82	16.37	17.17	18.83	24.19	30.02*	
	80	11.51	12.02	13.41	14.17	14.97	15.79	17.51	18.40	20.24	26.17	32.62*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.5 m (RADIUS = 6.7 m)
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	0	5	2.70	2.99	3.62	3.94	4.27	4.60	5.25	5.58	6.25	8.29	10.39*
		10	3.45	3.95	4.94	5.43	5.92	6.41	7.39	7.89	8.89	11.97	15.16*
		20	4.71	5.57	7.15	7.92	8.69	9.46	11.00	11.77	13.34	18.17	23.18*
		30	5.81	6.98	9.09	10.11	11.12	12.13	14.15	15.18	17.24	23.60	30.22*
		40	6.82	8.28	10.87	12.11	13.35	14.58	17.05	18.30	20.82	28.59	36.68*
		60	8.67	10.67	14.13	15.79	17.43	19.07	22.37	24.02	27.37	37.72	48.51*
		70	9.53	11.78	15.66	17.51	19.34	21.17	24.85	26.70	30.44	41.99	54.04*
		80	10.37	12.85	17.13	19.17	21.19	23.20	27.24	29.28	33.39	46.11	59.38*
10	5	3.22	3.38	3.90	4.19	4.49	4.80	5.43	5.75	6.40	8.41	10.49*	
	10	3.94	4.29	5.17	5.64	6.10	6.58	7.54	8.03	9.02	12.08	15.25*	
	20	5.13	5.86	7.35	8.10	8.85	9.60	11.12	11.89	13.45	18.25	23.26*	
	30	6.20	7.25	9.27	10.27	11.26	12.26	14.27	15.28	17.34	23.68	30.29*	
	40	7.18	8.53	11.04	12.26	13.48	14.70	17.16	18.40	20.91	28.66	36.74*	
	60	9.00	10.89	14.29	15.93	17.56	19.18	22.46	24.12	27.46	37.78	48.57*	
	70	9.85	11.99	15.81	17.64	19.46	21.28	24.94	26.79	30.52	42.05	54.09*	
	80	10.68	13.06	17.27	19.29	21.30	23.30	27.33	29.36	33.47	46.17	59.43*	
20	5	3.55	3.68	4.15	4.42	4.70	5.00	5.60	5.92	6.55	8.53	10.60*	
	10	4.32	4.60	5.40	5.84	6.29	6.75	7.69	8.17	9.15	12.18	15.33*	
	20	5.52	6.14	7.55	8.27	9.00	9.74	11.25	12.01	13.56	18.34	23.33*	
	30	6.57	7.51	9.45	10.42	11.40	12.39	14.38	15.39	17.43	23.75	30.35*	
	40	7.54	8.78	11.21	12.41	13.62	14.82	17.27	18.50	21.00	28.73	36.80*	
	60	9.32	11.11	14.44	16.06	17.68	19.30	22.56	24.21	27.54	37.85	48.62*	
	70	10.16	12.21	15.95	17.77	19.58	21.39	25.03	26.87	30.60	42.11	54.15*	
	80	10.98	13.27	17.41	19.42	21.41	23.41	27.42	29.45	33.55	46.23	59.48*	
50	5	4.18	4.29	4.72	4.98	5.24	5.52	6.09	6.38	6.98	8.89	10.90*	
	10	5.09	5.32	6.01	6.41	6.82	7.24	8.13	8.59	9.52	12.48	15.59*	
	20	6.43	6.90	8.12	8.78	9.47	10.17	11.62	12.36	13.87	18.59	23.55*	
	30	7.52	8.25	9.98	10.89	11.83	12.78	14.72	15.71	17.72	23.98	30.55*	
	40	8.49	9.48	11.70	12.85	14.01	15.19	17.58	18.80	21.27	28.94	36.99*	
	60	10.25	11.77	14.89	16.46	18.03	19.62	22.84	24.48	27.78	38.04	48.79*	
	70	11.07	12.84	16.38	18.15	19.92	21.70	25.31	27.13	30.83	42.30	54.31*	
	80	11.87	13.88	17.83	19.79	21.75	23.71	27.69	29.70	33.77	46.41	59.64*	
100	5	4.85	4.94	5.38	5.64	5.90	6.18	6.74	7.02	7.61	9.45	11.40*	
	10	5.93	6.13	6.79	7.17	7.56	7.96	8.80	9.23	10.13	12.97	16.02*	
	20	7.47	7.86	8.96	9.57	10.20	10.86	12.23	12.94	14.40	19.02	23.92*	
	30	8.67	9.27	10.80	11.64	12.52	13.42	15.28	16.24	18.20	24.37	30.88*	
	40	9.71	10.53	12.50	13.56	14.66	15.79	18.11	19.29	21.72	29.30	37.30*	
	60	11.54	12.79	15.62	17.11	18.63	20.17	23.32	24.92	28.19	38.37	49.07*	
	70	12.38	13.85	17.10	18.78	20.49	22.23	25.77	27.57	31.22	42.61	54.58*	
	80	13.18	14.87	18.52	20.40	22.30	24.22	28.13	30.12	34.15	46.71	59.90*	

SPACING = 9.5 m (RADIUS = 6.7 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 (m*s) ^{1/2}	5	5.33	5.43	5.88	6.14	6.41	6.69	7.25	7.54	8.13	9.95	11.88*	
	10	6.55	6.74	7.40	7.77	8.16	8.56	9.38	9.81	10.68	13.45	16.45*	
	20	8.24	8.61	9.66	10.25	10.86	11.49	12.81	13.50	14.91	19.43	24.28*	
	30	9.55	10.10	11.54	12.34	13.17	14.03	15.83	16.76	18.67	24.75	31.21*	
	40	10.67	11.40	13.24	14.24	15.29	16.37	18.62	19.78	22.16	29.66	37.60*	
	60	12.59	13.71	16.34	17.75	19.21	20.71	23.79	25.37	28.59	38.69	49.35*	
	70	13.46	14.77	17.79	19.40	21.06	22.75	26.22	27.99	31.61	42.92	54.85*	
	80	14.28	15.79	19.20	21.01	22.85	24.73	28.57	30.53	34.53	47.01	60.15*	
200	5	5.72	5.82	6.28	6.55	6.82	7.11	7.69	7.98	8.58	10.40	12.32*	
	10	7.06	7.24	7.90	8.28	8.67	9.07	9.89	10.31	11.18	13.91	16.87*	
	20	8.88	9.23	10.27	10.84	11.44	12.06	13.36	14.03	15.41	19.85	24.64*	
	30	10.28	10.79	12.19	12.97	13.77	14.61	16.36	17.27	19.14	25.13	31.54*	
	40	11.46	12.15	13.91	14.88	15.89	16.94	19.13	20.26	22.60	30.01	37.91*	
	60	13.48	14.51	17.01	18.37	19.79	21.24	24.26	25.81	28.99	39.01	49.62*	
	70	14.39	15.59	18.46	20.01	21.62	23.27	26.67	28.42	32.00	43.23	55.11*	
	80	15.24	16.62	19.86	21.60	23.39	25.23	29.01	30.95	34.90	47.31	60.41*	
250	5	6.06	6.16	6.63	6.90	7.19	7.48	8.07	8.37	8.97	10.81	12.73*	
	10	7.49	7.67	8.34	8.72	9.11	9.52	10.35	10.77	11.64	14.35	17.27*	
	20	9.43	9.77	10.80	11.38	11.97	12.59	13.87	14.53	15.89	20.26	25.00*	
	30	10.91	11.41	12.78	13.54	14.33	15.15	16.87	17.76	19.60	25.50	31.87*	
	40	12.15	12.81	14.53	15.47	16.46	17.49	19.63	20.74	23.03	30.36	38.22*	
	60	14.26	15.24	17.65	18.97	20.34	21.76	24.72	26.25	29.39	39.33	49.90*	
	70	15.20	16.34	19.10	20.60	22.17	23.78	27.12	28.85	32.38	43.54	55.38*	
	80	16.08	17.39	20.50	22.18	23.93	25.73	29.45	31.36	35.28	47.61	60.67*	
300	5	6.36	6.45	6.94	7.22	7.51	7.80	8.41	8.71	9.32	11.18	13.12*	
	10	7.87	8.05	8.73	9.11	9.51	9.92	10.76	11.19	12.05	14.76	17.67*	
	20	9.92	10.26	11.28	11.86	12.45	13.07	14.34	14.99	16.34	20.66	25.35*	
	30	11.47	11.95	13.31	14.07	14.85	15.66	17.36	18.23	20.04	25.87	32.19*	
	40	12.77	13.40	15.09	16.03	17.00	18.01	20.11	21.20	23.46	30.71	38.52*	
	60	14.96	15.90	18.25	19.54	20.88	22.27	25.18	26.69	29.79	39.65	50.18*	
	70	15.93	17.02	19.71	21.17	22.70	24.28	27.57	29.27	32.76	43.85	55.65*	
	80	16.84	18.09	21.11	22.75	24.45	26.22	29.88	31.77	35.65	47.91	60.93*	
400	5	6.87	6.97	7.47	7.76	8.07	8.37	9.00	9.31	9.94	11.85	13.81*	
	10	8.53	8.71	9.41	9.80	10.22	10.63	11.49	11.92	12.80	15.52	18.41*	
	20	10.77	11.09	12.13	12.71	13.31	13.93	15.20	15.85	17.18	21.43	26.05*	
	30	12.44	12.91	14.26	15.01	15.79	16.60	18.26	19.12	20.90	26.61	32.84*	
	40	13.84	14.45	16.11	17.03	17.98	18.97	21.03	22.09	24.30	31.41	39.13*	
	60	16.19	17.08	19.35	20.60	21.90	23.25	26.07	27.54	30.57	40.28	50.73*	
	70	17.22	18.24	20.83	22.24	23.72	25.25	28.44	30.10	33.52	44.46	56.18*	
	80	18.18	19.35	22.24	23.82	25.47	27.17	30.73	32.58	36.39	48.50	61.45*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 m (RADIUS = 7.1 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	5	0.88	0.90	1.01	1.08	1.14	1.21	1.34	1.41	1.55	1.96	2.38*	
	10	0.97	1.03	1.18	1.27	1.35	1.44	1.62	1.71	1.89	2.43	2.99*	
	20	1.14	1.24	1.47	1.59	1.71	1.84	2.08	2.21	2.46	3.22	4.01*	
	30	1.28	1.42	1.72	1.87	2.03	2.18	2.49	2.64	2.96	3.92	4.90*	
	40	1.41	1.59	1.95	2.13	2.31	2.50	2.86	3.05	3.42	4.55	5.72*	
	60	1.66	1.90	2.38	2.61	2.84	3.08	3.55	3.78	4.26	5.72	7.23*	
	70	1.77	2.05	2.57	2.83	3.09	3.35	3.86	4.12	4.65	6.26	7.93*	
	80	1.88	2.19	2.77	3.05	3.33	3.61	4.17	4.46	5.03	6.79	8.61*	
10	5	1.12	1.12	1.21	1.26	1.32	1.38	1.50	1.56	1.69	2.08	2.48*	
	10	1.25	1.27	1.38	1.45	1.53	1.60	1.76	1.85	2.01	2.54	3.08*	
	20	1.44	1.49	1.66	1.76	1.87	1.98	2.21	2.33	2.57	3.31	4.08*	
	30	1.60	1.67	1.90	2.03	2.17	2.31	2.60	2.75	3.06	3.99	4.97*	
	40	1.73	1.83	2.12	2.28	2.45	2.62	2.97	3.15	3.51	4.63	5.79*	
	60	1.96	2.12	2.53	2.74	2.96	3.19	3.64	3.87	4.34	5.78	7.28*	
	70	2.07	2.26	2.72	2.96	3.21	3.45	3.96	4.21	4.73	6.32	7.98*	
	80	2.17	2.40	2.91	3.17	3.44	3.71	4.26	4.54	5.11	6.85	8.66*	
20	5	1.23	1.22	1.31	1.37	1.43	1.49	1.61	1.67	1.80	2.19	2.58*	
	10	1.39	1.40	1.51	1.58	1.65	1.73	1.89	1.97	2.13	2.63	3.16*	
	20	1.61	1.64	1.81	1.90	2.00	2.11	2.33	2.44	2.67	3.40	4.15*	
	30	1.78	1.84	2.05	2.17	2.30	2.44	2.72	2.86	3.15	4.07	5.03*	
	40	1.93	2.01	2.27	2.42	2.58	2.74	3.07	3.25	3.60	4.70	5.85*	
	60	2.18	2.31	2.67	2.88	3.08	3.30	3.74	3.96	4.42	5.85	7.34*	
	70	2.30	2.45	2.86	3.09	3.32	3.56	4.05	4.30	4.81	6.39	8.04*	
	80	2.41	2.58	3.05	3.30	3.55	3.82	4.35	4.63	5.18	6.91	8.71*	
50	5	1.41	1.41	1.51	1.57	1.63	1.69	1.82	1.89	2.02	2.42	2.81*	
	10	1.63	1.64	1.76	1.83	1.90	1.98	2.14	2.22	2.39	2.89	3.40*	
	20	1.92	1.95	2.11	2.20	2.30	2.41	2.62	2.73	2.95	3.64	4.37*	
	30	2.14	2.18	2.38	2.50	2.62	2.75	3.01	3.15	3.42	4.30	5.23*	
	40	2.32	2.38	2.62	2.76	2.91	3.06	3.37	3.53	3.86	4.91	6.03*	
	60	2.62	2.72	3.04	3.22	3.41	3.61	4.02	4.23	4.66	6.04	7.50*	
	70	2.76	2.88	3.23	3.44	3.65	3.87	4.32	4.56	5.04	6.58	8.20*	
	80	2.88	3.02	3.42	3.64	3.87	4.11	4.62	4.88	5.41	7.09	8.87*	
100	5	1.61	1.61	1.71	1.77	1.84	1.91	2.05	2.12	2.26	2.67	3.08*	
	10	1.88	1.89	2.01	2.09	2.17	2.25	2.42	2.51	2.68	3.20	3.71*	
	20	2.24	2.27	2.43	2.53	2.64	2.74	2.96	3.07	3.30	3.98	4.69*	
	30	2.51	2.55	2.75	2.87	3.00	3.13	3.39	3.52	3.79	4.65	5.54*	
	40	2.73	2.79	3.03	3.16	3.31	3.46	3.76	3.92	4.24	5.25	6.33*	
	60	3.10	3.18	3.49	3.66	3.85	4.03	4.42	4.63	5.04	6.36	7.78*	
	70	3.25	3.36	3.70	3.89	4.09	4.30	4.73	4.95	5.41	6.88	8.46*	
	80	3.40	3.52	3.89	4.10	4.32	4.55	5.02	5.27	5.77	7.39	9.12*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 m (RADIUS = 7.1 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 (m*s) ^{1/2}	5	1.75	1.75	1.85	1.92	1.99	2.06	2.21	2.28	2.43	2.87	3.29*	
	10	2.06	2.07	2.20	2.28	2.37	2.45	2.63	2.72	2.90	3.43	3.96*	
	20	2.47	2.50	2.67	2.78	2.88	3.00	3.22	3.34	3.57	4.26	4.98*	
	30	2.78	2.82	3.03	3.15	3.28	3.41	3.68	3.82	4.09	4.95	5.83*	
	40	3.03	3.08	3.33	3.47	3.62	3.77	4.08	4.23	4.55	5.56	6.61*	
	60	3.44	3.52	3.83	4.01	4.19	4.38	4.76	4.96	5.37	6.66	8.05*	
	70	3.62	3.71	4.05	4.25	4.45	4.65	5.08	5.30	5.75	7.18	8.72*	
	80	3.78	3.89	4.26	4.47	4.69	4.91	5.38	5.62	6.11	7.68	9.37*	
200	5	1.86	1.86	1.97	2.04	2.11	2.19	2.34	2.42	2.57	3.02	3.46*	
	10	2.20	2.22	2.35	2.44	2.53	2.62	2.80	2.89	3.08	3.63	4.17*	
	20	2.66	2.69	2.87	2.98	3.09	3.20	3.44	3.55	3.79	4.50	5.22*	
	30	3.00	3.04	3.25	3.38	3.51	3.65	3.92	4.06	4.34	5.21	6.09*	
	40	3.27	3.32	3.57	3.72	3.87	4.02	4.34	4.50	4.83	5.83	6.88*	
	60	3.72	3.80	4.11	4.29	4.48	4.67	5.06	5.26	5.66	6.94	8.30*	
	70	3.91	4.01	4.35	4.54	4.75	4.95	5.38	5.60	6.05	7.46	8.97*	
	80	4.09	4.20	4.57	4.78	5.00	5.22	5.69	5.92	6.41	7.96	9.62*	
250	5	1.96	1.96	2.07	2.15	2.22	2.30	2.46	2.53	2.69	3.16	3.61*	
	10	2.33	2.34	2.48	2.57	2.66	2.76	2.95	3.04	3.23	3.80	4.35*	
	20	2.82	2.85	3.03	3.15	3.26	3.38	3.62	3.74	3.98	4.71	5.44*	
	30	3.18	3.22	3.45	3.58	3.71	3.85	4.13	4.28	4.56	5.44	6.33*	
	40	3.48	3.53	3.79	3.94	4.09	4.25	4.57	4.73	5.06	6.08	7.12*	
	60	3.96	4.04	4.36	4.54	4.73	4.92	5.32	5.52	5.93	7.20	8.55*	
	70	4.17	4.26	4.61	4.80	5.01	5.22	5.65	5.87	6.32	7.72	9.22*	
	80	4.36	4.46	4.84	5.05	5.27	5.50	5.96	6.20	6.69	8.22	9.87*	
300	5	2.04	2.04	2.16	2.24	2.31	2.39	2.56	2.64	2.80	3.28	3.74*	
	10	2.44	2.45	2.60	2.69	2.78	2.88	3.08	3.17	3.37	3.95	4.52*	
	20	2.96	2.99	3.18	3.30	3.42	3.54	3.78	3.91	4.16	4.90	5.64*	
	30	3.35	3.39	3.62	3.75	3.89	4.03	4.32	4.47	4.76	5.65	6.55*	
	40	3.66	3.71	3.98	4.13	4.29	4.45	4.78	4.94	5.28	6.30	7.35*	
	60	4.17	4.25	4.57	4.76	4.95	5.15	5.55	5.75	6.17	7.45	8.79*	
	70	4.39	4.48	4.83	5.03	5.24	5.46	5.89	6.11	6.56	7.97	9.46*	
	80	4.59	4.70	5.08	5.29	5.52	5.74	6.21	6.45	6.94	8.47	10.10*	
400	5	2.19	2.19	2.32	2.39	2.48	2.56	2.73	2.81	2.98	3.48	3.96*	
	10	2.63	2.64	2.80	2.89	2.99	3.09	3.30	3.40	3.61	4.21	4.80*	
	20	3.21	3.24	3.44	3.56	3.68	3.81	4.07	4.20	4.46	5.23	5.99*	
	30	3.63	3.67	3.91	4.05	4.20	4.35	4.65	4.80	5.11	6.02	6.94*	
	40	3.98	4.03	4.30	4.46	4.63	4.80	5.14	5.31	5.66	6.70	7.77*	
	60	4.54	4.62	4.95	5.14	5.34	5.54	5.96	6.17	6.59	7.89	9.23*	
	70	4.78	4.87	5.23	5.44	5.65	5.87	6.32	6.55	7.01	8.42	9.90*	
	80	5.00	5.10	5.49	5.71	5.94	6.18	6.66	6.90	7.40	8.93	10.55*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 m (RADIUS = 7.1 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2} 0	5	1.25	1.31	1.51	1.61	1.72	1.83	2.05	2.16	2.38	3.06	3.75*
	10	1.45	1.56	1.85	1.99	2.14	2.29	2.60	2.75	3.06	4.00	4.96*
	20	1.78	1.99	2.42	2.64	2.86	3.08	3.53	3.75	4.20	5.58	7.00*
	30	2.07	2.36	2.93	3.21	3.49	3.77	4.34	4.62	5.20	6.97	8.79*
	40	2.33	2.70	3.39	3.73	4.07	4.40	5.08	5.43	6.12	8.24	10.43*
	60	2.82	3.32	4.24	4.68	5.12	5.56	6.45	6.90	7.80	10.57	13.44*
	70	3.04	3.61	4.63	5.13	5.62	6.11	7.09	7.58	8.58	11.65	14.84*
	80	3.26	3.89	5.01	5.55	6.09	6.63	7.71	8.25	9.34	12.71	16.20*
10	5	1.59	1.60	1.74	1.83	1.92	2.02	2.22	2.32	2.53	3.18	3.85*
	10	1.81	1.86	2.07	2.20	2.33	2.47	2.75	2.89	3.19	4.10	5.05*
	20	2.15	2.27	2.62	2.82	3.02	3.23	3.65	3.87	4.31	5.67	7.07*
	30	2.43	2.62	3.11	3.37	3.63	3.90	4.45	4.73	5.30	7.04	8.86*
	40	2.68	2.94	3.56	3.88	4.20	4.53	5.19	5.53	6.21	8.31	10.49*
	60	3.14	3.54	4.39	4.82	5.24	5.68	6.55	6.99	7.88	10.63	13.49*
	70	3.36	3.83	4.78	5.26	5.73	6.21	7.18	7.67	8.66	11.72	14.90*
	80	3.57	4.10	5.16	5.68	6.21	6.73	7.80	8.33	9.42	12.77	16.25*
20	5	1.75	1.76	1.90	1.98	2.07	2.17	2.36	2.46	2.67	3.30	3.95*
	10	2.01	2.05	2.25	2.37	2.49	2.62	2.89	3.03	3.31	4.20	5.13*
	20	2.39	2.48	2.80	2.98	3.17	3.37	3.78	3.99	4.42	5.75	7.15*
	30	2.69	2.84	3.28	3.52	3.78	4.03	4.57	4.84	5.40	7.12	8.92*
	40	2.96	3.17	3.72	4.02	4.33	4.65	5.30	5.63	6.30	8.38	10.55*
	60	3.43	3.76	4.54	4.95	5.37	5.79	6.65	7.08	7.96	10.70	13.55*
	70	3.64	4.04	4.92	5.38	5.85	6.32	7.28	7.76	8.74	11.78	14.95*
	80	3.85	4.30	5.30	5.81	6.32	6.84	7.89	8.42	9.49	12.83	16.30*
50	5	2.03	2.04	2.19	2.28	2.37	2.47	2.67	2.77	2.97	3.60	4.23*
	10	2.38	2.41	2.61	2.72	2.85	2.97	3.24	3.37	3.64	4.49	5.39*
	20	2.85	2.93	3.22	3.39	3.56	3.75	4.13	4.32	4.73	6.01	7.36*
	30	3.22	3.33	3.72	3.94	4.17	4.40	4.90	5.16	5.68	7.35	9.12*
	40	3.52	3.68	4.16	4.43	4.71	5.00	5.61	5.93	6.57	8.60	10.74*
	60	4.05	4.30	4.97	5.34	5.72	6.12	6.93	7.35	8.21	10.89	13.72*
	70	4.29	4.58	5.34	5.76	6.19	6.64	7.55	8.02	8.98	11.97	15.11*
	80	4.51	4.85	5.71	6.17	6.65	7.14	8.16	8.67	9.72	13.01	16.46*
100	5	2.33	2.34	2.49	2.59	2.69	2.79	3.00	3.11	3.32	3.97	4.61*
	10	2.76	2.79	2.99	3.12	3.24	3.38	3.64	3.78	4.06	4.90	5.78*
	20	3.34	3.41	3.70	3.87	4.04	4.22	4.60	4.79	5.18	6.41	7.72*
	30	3.78	3.88	4.25	4.46	4.68	4.91	5.38	5.63	6.13	7.73	9.44*
	40	4.14	4.28	4.73	4.98	5.25	5.52	6.09	6.39	7.00	8.95	11.04*
	60	4.75	4.96	5.57	5.91	6.26	6.63	7.39	7.79	8.61	11.22	13.99*
	70	5.02	5.26	5.95	6.33	6.73	7.14	8.00	8.45	9.37	12.28	15.38*
	80	5.27	5.55	6.32	6.74	7.18	7.64	8.59	9.09	10.10	13.31	16.72*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 m (RADIUS = 7.1 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	2.54	2.55	2.72	2.82	2.92	3.03	3.25	3.36	3.58	4.25	4.90*
	10	3.04	3.07	3.28	3.41	3.54	3.67	3.95	4.09	4.38	5.24	6.11*
	20	3.70	3.76	4.06	4.23	4.41	4.59	4.97	5.16	5.55	6.77	8.06*
	30	4.19	4.28	4.65	4.87	5.09	5.32	5.79	6.03	6.52	8.09	9.76*
	40	4.59	4.72	5.17	5.42	5.68	5.95	6.52	6.81	7.40	9.30	11.34*
	60	5.27	5.46	6.05	6.38	6.72	7.08	7.82	8.20	9.00	11.54	14.27*
	70	5.56	5.79	6.45	6.82	7.20	7.60	8.43	8.86	9.75	12.59	15.64*
	80	5.84	6.10	6.83	7.23	7.66	8.10	9.01	9.49	10.47	13.61	16.97*
200	5	2.72	2.73	2.90	3.00	3.11	3.22	3.45	3.57	3.80	4.48	5.15*
	10	3.26	3.29	3.51	3.64	3.78	3.92	4.21	4.35	4.64	5.52	6.41*
	20	3.98	4.05	4.35	4.53	4.71	4.90	5.28	5.48	5.88	7.10	8.37*
	30	4.52	4.61	4.99	5.21	5.43	5.66	6.14	6.38	6.87	8.42	10.07*
	40	4.96	5.09	5.53	5.79	6.05	6.32	6.88	7.17	7.76	9.63	11.64*
	60	5.69	5.88	6.46	6.79	7.13	7.48	8.21	8.59	9.36	11.85	14.54*
	70	6.01	6.23	6.87	7.24	7.62	8.01	8.82	9.24	10.11	12.90	15.91*
	80	6.31	6.55	7.27	7.66	8.08	8.51	9.41	9.87	10.83	13.91	17.23*
250	5	2.87	2.88	3.05	3.16	3.27	3.39	3.63	3.74	3.98	4.68	5.37*
	10	3.45	3.48	3.71	3.84	3.99	4.13	4.43	4.58	4.87	5.77	6.67*
	20	4.23	4.29	4.60	4.78	4.97	5.16	5.56	5.76	6.16	7.39	8.66*
	30	4.80	4.90	5.28	5.50	5.73	5.96	6.44	6.69	7.19	8.73	10.37*
	40	5.28	5.40	5.85	6.11	6.38	6.65	7.21	7.50	8.09	9.95	11.93*
	60	6.06	6.24	6.82	7.15	7.49	7.84	8.56	8.94	9.71	12.16	14.81*
	70	6.40	6.60	7.25	7.61	7.99	8.38	9.18	9.60	10.45	13.20	16.17*
	80	6.71	6.95	7.65	8.05	8.46	8.89	9.77	10.23	11.17	14.21	17.48*
300	5	3.00	3.01	3.19	3.30	3.42	3.54	3.78	3.90	4.14	4.86	5.56*
	10	3.62	3.65	3.88	4.02	4.17	4.32	4.62	4.78	5.08	6.00	6.90*
	20	4.45	4.51	4.83	5.01	5.21	5.40	5.80	6.01	6.41	7.66	8.94*
	30	5.06	5.15	5.54	5.76	6.00	6.23	6.72	6.97	7.47	9.02	10.65*
	40	5.56	5.68	6.14	6.40	6.67	6.94	7.51	7.80	8.39	10.24	12.21*
	60	6.38	6.56	7.14	7.47	7.81	8.17	8.89	9.26	10.03	12.46	15.07*
	70	6.74	6.94	7.59	7.95	8.33	8.71	9.52	9.93	10.78	13.49	16.43*
	80	7.07	7.30	8.01	8.40	8.81	9.23	10.11	10.57	11.50	14.49	17.73*
400	5	3.22	3.23	3.43	3.54	3.67	3.79	4.04	4.17	4.43	5.18	5.90*
	10	3.91	3.94	4.19	4.34	4.49	4.65	4.96	5.12	5.44	6.39	7.32*
	20	4.82	4.89	5.22	5.41	5.61	5.82	6.23	6.44	6.86	8.14	9.43*
	30	5.49	5.58	5.99	6.22	6.46	6.71	7.21	7.46	7.97	9.55	11.17*
	40	6.04	6.16	6.63	6.90	7.18	7.46	8.04	8.34	8.93	10.79	12.74*
	60	6.94	7.11	7.71	8.04	8.39	8.75	9.48	9.85	10.61	13.02	15.59*
	70	7.33	7.53	8.18	8.55	8.93	9.32	10.12	10.53	11.38	14.05	16.93*
	80	7.69	7.91	8.62	9.02	9.43	9.86	10.73	11.18	12.11	15.05	18.23*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 m (RADIUS = 7.1 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
0	5	1.85	1.98	2.33	2.51	2.69	2.88	3.25	3.44	3.82	4.98	6.16*
	10	2.24	2.48	3.01	3.28	3.54	3.81	4.35	4.63	5.18	6.86	8.58*
	20	2.90	3.33	4.16	4.57	4.98	5.39	6.21	6.62	7.46	10.01	12.66*
	30	3.47	4.07	5.17	5.70	6.23	6.77	7.83	8.37	9.45	12.78	16.24*
	40	4.00	4.75	6.09	6.74	7.39	8.03	9.33	9.98	11.29	15.33	19.52*
	60	4.97	5.99	7.79	8.65	9.50	10.35	12.06	12.92	14.65	19.99	25.54*
	70	5.43	6.57	8.58	9.54	10.49	11.44	13.34	14.29	16.22	22.16	28.35*
	80	5.87	7.13	9.34	10.40	11.44	12.48	14.57	15.62	17.74	24.26	31.06*
10	5	2.28	2.33	2.60	2.75	2.91	3.08	3.43	3.61	3.97	5.10	6.26*
	10	2.68	2.82	3.25	3.49	3.73	3.99	4.51	4.77	5.31	6.96	8.67*
	20	3.31	3.62	4.36	4.75	5.14	5.53	6.34	6.74	7.56	10.10	12.74*
	30	3.86	4.34	5.35	5.86	6.38	6.90	7.95	8.48	9.55	12.86	16.30*
	40	4.37	5.00	6.26	6.89	7.52	8.16	9.43	10.08	11.38	15.40	19.58*
	60	5.31	6.22	7.94	8.78	9.62	10.46	12.16	13.01	14.73	20.05	25.59*
	70	5.75	6.79	8.73	9.67	10.61	11.54	13.43	14.38	16.30	22.23	28.40*
	80	6.18	7.35	9.49	10.52	11.56	12.59	14.66	15.70	17.81	24.33	31.11*
20	5	2.52	2.56	2.80	2.95	3.11	3.27	3.60	3.77	4.12	5.22	6.36*
	10	2.97	3.08	3.46	3.68	3.92	4.16	4.65	4.91	5.43	7.06	8.76*
	20	3.64	3.89	4.56	4.92	5.30	5.68	6.46	6.86	7.67	10.19	12.81*
	30	4.20	4.59	5.53	6.02	6.52	7.03	8.06	8.59	9.65	12.94	16.37*
	40	4.71	5.24	6.43	7.04	7.66	8.28	9.54	10.18	11.47	15.47	19.65*
	60	5.63	6.44	8.09	8.92	9.75	10.58	12.25	13.10	14.82	20.12	25.65*
	70	6.06	7.01	8.87	9.80	10.72	11.65	13.52	14.47	16.38	22.29	28.46*
	80	6.48	7.55	9.63	10.65	11.67	12.69	14.75	15.79	17.89	24.39	31.16*
50	5	2.95	2.99	3.23	3.37	3.53	3.68	4.01	4.17	4.51	5.56	6.66*
	10	3.52	3.60	3.96	4.16	4.38	4.60	5.07	5.31	5.80	7.36	9.01*
	20	4.32	4.50	5.08	5.41	5.75	6.10	6.84	7.21	7.99	10.45	13.03*
	30	4.94	5.24	6.04	6.48	6.95	7.42	8.41	8.91	9.94	13.17	16.57*
	40	5.49	5.89	6.92	7.48	8.05	8.65	9.86	10.48	11.74	15.69	19.83*
	60	6.44	7.08	8.54	9.32	10.11	10.91	12.54	13.37	15.06	20.32	25.82*
	70	6.88	7.63	9.31	10.18	11.07	11.97	13.80	14.73	16.62	22.48	28.62*
	80	7.30	8.16	10.05	11.02	12.01	13.00	15.02	16.04	18.12	24.57	31.32*
100	5	3.41	3.44	3.69	3.84	4.00	4.16	4.50	4.66	5.00	6.05	7.13*
	10	4.10	4.18	4.53	4.73	4.95	5.17	5.63	5.86	6.34	7.84	9.44*
	20	5.05	5.21	5.75	6.06	6.38	6.72	7.41	7.77	8.51	10.87	13.39*
	30	5.78	6.02	6.75	7.16	7.59	8.03	8.95	9.43	10.42	13.56	16.90*
	40	6.39	6.73	7.64	8.15	8.68	9.23	10.38	10.97	12.19	16.05	20.14*
	60	7.45	7.96	9.25	9.96	10.70	11.45	13.02	13.83	15.47	20.64	26.09*
	70	7.92	8.52	10.01	10.81	11.64	12.50	14.26	15.17	17.01	22.80	28.88*
	80	8.36	9.06	10.73	11.63	12.56	13.51	15.47	16.47	18.50	24.88	31.58*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 m (RADIUS = 7.1 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	3.74	3.77	4.03	4.19	4.35	4.52	4.86	5.04	5.39	6.45	7.53*
	10	4.52	4.59	4.95	5.16	5.38	5.61	6.07	6.31	6.79	8.27	9.84*
	20	5.59	5.74	6.28	6.58	6.90	7.23	7.91	8.26	8.98	11.28	13.75*
	30	6.39	6.62	7.33	7.72	8.14	8.57	9.46	9.92	10.88	13.94	17.22*
	40	7.07	7.37	8.25	8.74	9.25	9.78	10.88	11.45	12.63	16.41	20.44*
	60	8.21	8.67	9.89	10.56	11.26	11.98	13.49	14.27	15.88	20.97	26.37*
	70	8.71	9.26	10.64	11.40	12.19	13.01	14.72	15.60	17.40	23.11	29.15*
	80	9.19	9.81	11.37	12.22	13.10	14.02	15.91	16.88	18.88	25.18	31.84*
200	5	4.00	4.03	4.30	4.47	4.64	4.81	5.17	5.34	5.70	6.79	7.87*
	10	4.86	4.94	5.30	5.52	5.74	5.97	6.44	6.68	7.17	8.66	10.21*
	20	6.03	6.17	6.71	7.02	7.34	7.67	8.35	8.70	9.41	11.67	14.10*
	30	6.90	7.11	7.81	8.21	8.62	9.04	9.92	10.38	11.31	14.31	17.55*
	40	7.62	7.91	8.77	9.25	9.75	10.27	11.35	11.91	13.06	16.76	20.75*
	60	8.84	9.28	10.45	11.10	11.78	12.48	13.94	14.70	16.27	21.29	26.65*
	70	9.38	9.89	11.22	11.95	12.71	13.51	15.16	16.02	17.79	23.42	29.42*
	80	9.88	10.46	11.95	12.77	13.62	14.50	16.34	17.30	19.26	25.48	32.09*
250	5	4.23	4.26	4.54	4.71	4.88	5.06	5.43	5.61	5.98	7.08	8.19*
	10	5.16	5.23	5.60	5.83	6.06	6.29	6.77	7.01	7.51	9.01	10.56*
	20	6.40	6.55	7.09	7.40	7.73	8.06	8.74	9.09	9.80	12.05	14.44*
	30	7.33	7.54	8.24	8.64	9.05	9.47	10.35	10.80	11.72	14.68	17.87*
	40	8.10	8.38	9.23	9.71	10.21	10.72	11.78	12.33	13.47	17.11	21.05*
	60	9.39	9.81	10.96	11.59	12.26	12.94	14.38	15.13	16.67	21.61	26.92*
	70	9.96	10.44	11.74	12.45	13.20	13.98	15.59	16.44	18.17	23.73	29.68*
	80	10.48	11.03	12.48	13.28	14.11	14.97	16.77	17.70	19.63	25.78	32.35*
300	5	4.43	4.46	4.75	4.92	5.10	5.29	5.66	5.85	6.22	7.35	8.47*
	10	5.42	5.49	5.87	6.10	6.33	6.57	7.06	7.31	7.81	9.33	10.88*
	20	6.73	6.88	7.43	7.74	8.07	8.41	9.10	9.45	10.16	12.40	14.77*
	30	7.71	7.92	8.63	9.02	9.44	9.86	10.73	11.18	12.10	15.03	18.18*
	40	8.53	8.80	9.65	10.13	10.62	11.13	12.19	12.73	13.86	17.46	21.35*
	60	9.88	10.28	11.42	12.05	12.70	13.38	14.80	15.53	17.05	21.93	27.19*
	70	10.47	10.94	12.21	12.92	13.66	14.42	16.01	16.84	18.55	24.04	29.95*
	80	11.02	11.55	12.97	13.75	14.57	15.41	17.18	18.10	20.00	26.08	32.61*
400	5	4.78	4.81	5.11	5.29	5.48	5.67	6.06	6.26	6.65	7.82	8.97*
	10	5.86	5.94	6.34	6.57	6.82	7.06	7.57	7.83	8.34	9.90	11.47*
	20	7.31	7.45	8.02	8.34	8.68	9.02	9.72	10.08	10.81	13.05	15.40*
	30	8.38	8.58	9.30	9.70	10.12	10.55	11.43	11.88	12.80	15.70	18.80*
	40	9.27	9.53	10.38	10.86	11.36	11.87	12.93	13.47	14.58	18.12	21.94*
	60	10.73	11.11	12.24	12.86	13.51	14.18	15.57	16.29	17.78	22.56	27.74*
	70	11.36	11.81	13.07	13.76	14.49	15.24	16.79	17.60	19.27	24.65	30.47*
	80	11.95	12.46	13.85	14.62	15.42	16.24	17.97	18.86	20.71	26.68	33.12*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 m (RADIUS = 7.1 m)
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE		CEILING HEIGHT, m										
(m*s) ^{1/2}		1	2	4	5	6	7	9	10	12	18	24		
0	5	2.83	3.12	3.75	4.08	4.40	4.73	5.39	5.72	6.39	8.44	10.54*		
	10	3.61	4.12	5.12	5.61	6.11	6.60	7.60	8.10	9.10	12.20	15.40*		
	20	4.93	5.81	7.42	8.20	8.97	9.75	11.30	12.09	13.66	18.52	23.55*		
	30	6.08	7.29	9.43	10.46	11.49	12.51	14.55	15.58	17.66	24.06	30.71*		
	40	7.14	8.65	11.28	12.54	13.79	15.04	17.54	18.80	21.33	29.15	37.28*		
	60	9.08	11.14	14.67	16.36	18.02	19.68	23.00	24.68	28.05	38.46	49.30*		
	70	9.99	12.30	16.26	18.14	20.00	21.85	25.56	27.43	31.20	42.82	54.93*		
	80	10.86	13.42	17.78	19.85	21.90	23.94	28.02	30.08	34.23	47.02	60.35*		
10	5	3.36	3.51	4.03	4.33	4.63	4.94	5.57	5.89	6.55	8.56	10.65*		
	10	4.11	4.47	5.36	5.82	6.30	6.78	7.75	8.24	9.23	12.30	15.48*		
	20	5.36	6.11	7.62	8.38	9.13	9.90	11.43	12.21	13.77	18.61	23.63*		
	30	6.48	7.56	9.62	10.63	11.63	12.64	14.67	15.69	17.76	24.14	30.77*		
	40	7.51	8.90	11.45	12.69	13.93	15.16	17.65	18.90	21.42	29.22	37.34*		
	60	9.42	11.36	14.83	16.49	18.14	19.79	23.10	24.77	28.14	38.53	49.36*		
	70	10.31	12.52	16.40	18.27	20.11	21.96	25.65	27.52	31.28	42.88	54.98*		
	80	11.18	13.63	17.93	19.98	22.01	24.04	28.12	30.17	34.30	47.08	60.40*		
20	5	3.70	3.82	4.29	4.56	4.84	5.14	5.75	6.06	6.70	8.69	10.75*		
	10	4.50	4.79	5.59	6.03	6.49	6.95	7.90	8.38	9.36	12.41	15.57*		
	20	5.76	6.40	7.82	8.55	9.29	10.04	11.56	12.33	13.88	18.69	23.70*		
	30	6.86	7.82	9.80	10.79	11.78	12.77	14.78	15.80	17.86	24.21	30.84*		
	40	7.87	9.15	11.62	12.84	14.06	15.29	17.75	19.00	21.52	29.29	37.40*		
	60	9.75	11.59	14.98	16.63	18.26	19.90	23.20	24.86	28.22	38.59	49.42*		
	70	10.63	12.73	16.55	18.40	20.23	22.06	25.75	27.60	31.36	42.94	55.03*		
	80	11.49	13.84	18.07	20.11	22.13	24.15	28.21	30.25	34.38	47.14	60.46*		
50	5	4.35	4.45	4.88	5.13	5.40	5.67	6.24	6.53	7.14	9.05	11.06*		
	10	5.30	5.52	6.21	6.61	7.02	7.45	8.34	8.80	9.74	12.71	15.83*		
	20	6.69	7.17	8.40	9.07	9.77	10.48	11.94	12.69	14.21	18.95	23.92*		
	30	7.83	8.58	10.33	11.26	12.21	13.17	15.13	16.13	18.15	24.45	31.04*		
	40	8.85	9.87	12.13	13.29	14.47	15.66	18.08	19.30	21.79	29.51	37.58*		
	60	10.69	12.25	15.44	17.03	18.63	20.24	23.49	25.14	28.47	38.79	49.58*		
	70	11.55	13.38	16.99	18.79	20.58	22.39	26.03	27.87	31.59	43.13	55.20*		
	80	12.39	14.47	18.50	20.48	22.47	24.46	28.48	30.51	34.61	47.33	60.61*		
100	5	5.04	5.13	5.56	5.81	6.07	6.34	6.90	7.19	7.78	9.61	11.56*		
	10	6.17	6.36	7.01	7.39	7.78	8.18	9.02	9.46	10.36	13.21	16.26*		
	20	7.77	8.16	9.26	9.87	10.51	11.18	12.56	13.27	14.74	19.38	24.29*		
	30	9.02	9.63	11.18	12.03	12.91	13.82	15.70	16.66	18.64	24.84	31.37*		
	40	10.11	10.94	12.94	14.02	15.13	16.27	18.61	19.80	22.24	29.87	37.89*		
	60	12.02	13.30	16.19	17.70	19.23	20.79	23.97	25.59	28.88	39.12	49.86*		
	70	12.90	14.41	17.72	19.43	21.16	22.92	26.49	28.31	31.99	43.45	55.46*		
	80	13.73	15.48	19.20	21.11	23.03	24.98	28.93	30.93	35.00	47.63	60.87*		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 m (RADIUS = 7.1 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	5.54	5.63	6.06	6.32	6.59	6.87	7.43	7.72	8.31	10.13	12.04*
	10	6.81	6.99	7.64	8.01	8.39	8.79	9.62	10.05	10.92	13.70	16.69*
	20	8.57	8.93	9.98	10.57	11.18	11.82	13.15	13.84	15.26	19.80	24.65*
	30	9.93	10.48	11.93	12.73	13.57	14.44	16.25	17.19	19.12	25.22	31.70*
	40	11.09	11.83	13.69	14.71	15.77	16.86	19.13	20.30	22.69	30.23	38.20*
	60	13.10	14.24	16.91	18.35	19.83	21.34	24.45	26.04	29.29	39.45	50.14*
	70	14.01	15.35	18.43	20.06	21.74	23.45	26.95	28.74	32.39	43.77	55.73*
	80	14.87	16.41	19.89	21.72	23.59	25.49	29.38	31.35	35.38	47.94	61.13*
200	5	5.95	6.03	6.48	6.74	7.02	7.30	7.88	8.17	8.76	10.59	12.48*
	10	7.33	7.50	8.15	8.53	8.92	9.32	10.14	10.56	11.43	14.17	17.10*
	20	9.23	9.57	10.60	11.18	11.78	12.41	13.71	14.38	15.77	20.22	25.01*
	30	10.68	11.20	12.60	13.38	14.19	15.03	16.79	17.71	19.59	25.61	32.03*
	40	11.92	12.60	14.38	15.36	16.38	17.44	19.65	20.79	23.14	30.59	38.51*
	60	14.02	15.07	17.60	18.98	20.41	21.88	24.93	26.49	29.70	39.77	50.42*
	70	14.96	16.19	19.11	20.68	22.31	23.97	27.41	29.18	32.78	44.08	56.00*
	80	15.85	17.27	20.56	22.33	24.14	26.00	29.82	31.77	35.76	48.24	61.39*
250	5	6.30	6.38	6.84	7.11	7.39	7.68	8.26	8.56	9.16	11.00	12.90*
	10	7.78	7.95	8.60	8.98	9.37	9.78	10.61	11.03	11.90	14.62	17.51*
	20	9.80	10.13	11.15	11.73	12.33	12.94	14.22	14.89	16.25	20.64	25.37*
	30	11.34	11.83	13.20	13.97	14.76	15.59	17.31	18.21	20.06	25.99	32.35*
	40	12.63	13.28	15.01	15.97	16.96	18.00	20.15	21.27	23.58	30.95	38.81*
	60	14.83	15.82	18.26	19.59	20.98	22.41	25.40	26.94	30.10	40.10	50.70*
	70	15.81	16.96	19.76	21.28	22.86	24.49	27.87	29.61	33.17	44.39	56.27*
	80	16.72	18.05	21.21	22.92	24.69	26.51	30.26	32.19	36.14	48.54	61.65*
300	5	6.61	6.69	7.16	7.43	7.72	8.01	8.61	8.91	9.52	11.38	13.28*
	10	8.18	8.34	9.01	9.39	9.79	10.19	11.03	11.46	12.32	15.04	17.91*
	20	10.31	10.63	11.65	12.22	12.82	13.43	14.71	15.36	16.72	21.05	25.72*
	30	11.92	12.39	13.75	14.51	15.30	16.11	17.81	18.69	20.51	26.37	32.68*
	40	13.27	13.90	15.60	16.53	17.51	18.53	20.65	21.75	24.02	31.31	39.12*
	60	15.55	16.50	18.87	20.17	21.53	22.93	25.86	27.38	30.50	40.42	50.97*
	70	16.56	17.67	20.38	21.86	23.41	25.00	28.32	30.04	33.56	44.71	56.53*
	80	17.51	18.78	21.83	23.50	25.22	27.01	30.70	32.61	36.52	48.85	61.91*
400	5	7.14	7.22	7.71	7.99	8.29	8.60	9.22	9.53	10.16	12.06	13.98*
	10	8.86	9.02	9.71	10.10	10.51	10.92	11.78	12.21	13.09	15.81	18.65*
	20	11.18	11.49	12.52	13.10	13.70	14.31	15.58	16.24	17.57	21.84	26.43*
	30	12.92	13.38	14.73	15.48	16.26	17.06	18.73	19.60	21.38	27.12	33.33*
	40	14.38	14.98	16.64	17.56	18.52	19.51	21.58	22.65	24.87	32.01	39.72*
	60	16.82	17.71	20.00	21.26	22.57	23.93	26.77	28.25	31.30	41.07	51.52*
	70	17.89	18.92	21.53	22.96	24.45	25.99	29.21	30.88	34.33	45.33	57.06*
	80	18.89	20.07	22.99	24.59	26.26	27.98	31.57	33.44	37.27	49.45	62.42*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.5 m (RADIUS = 7.4 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	°C												
	5	0.91	0.94	1.05	1.11	1.17	1.24	1.38	1.44	1.58	2.00	2.41	
	10	1.02	1.07	1.22	1.31	1.39	1.48	1.66	1.75	1.93	2.48	3.03	
	20	1.19	1.29	1.52	1.64	1.76	1.89	2.14	2.26	2.51	3.28	4.07	
	30	1.34	1.48	1.78	1.93	2.09	2.24	2.55	2.71	3.02	3.99	4.98	
	40	1.48	1.66	2.02	2.20	2.39	2.57	2.94	3.12	3.49	4.64	5.81	
	60	1.73	1.98	2.46	2.70	2.93	3.17	3.64	3.88	4.36	5.82	7.34	
	70	1.85	2.13	2.67	2.93	3.19	3.45	3.97	4.23	4.76	6.38	8.05	
10	80	1.96	2.28	2.86	3.15	3.43	3.72	4.28	4.57	5.15	6.91	8.74	
	5	1.17	1.16	1.24	1.30	1.36	1.41	1.54	1.60	1.73	2.12	2.52	
	10	1.31	1.32	1.43	1.50	1.57	1.65	1.81	1.89	2.06	2.58	3.12	
	20	1.50	1.54	1.71	1.82	1.92	2.03	2.26	2.38	2.62	3.37	4.14	
	30	1.66	1.73	1.96	2.10	2.23	2.38	2.67	2.82	3.12	4.07	5.04	
	40	1.80	1.90	2.19	2.35	2.52	2.69	3.05	3.22	3.59	4.71	5.87	
	60	2.04	2.21	2.62	2.83	3.06	3.28	3.74	3.97	4.44	5.89	7.40	
	70	2.16	2.35	2.82	3.06	3.31	3.56	4.06	4.32	4.84	6.44	8.11	
20	80	2.27	2.49	3.01	3.28	3.55	3.82	4.38	4.66	5.22	6.98	8.80	
	5	1.28	1.27	1.35	1.41	1.46	1.52	1.65	1.71	1.84	2.22	2.62	
	10	1.44	1.45	1.56	1.63	1.70	1.77	1.93	2.01	2.17	2.68	3.21	
	20	1.68	1.70	1.86	1.96	2.06	2.17	2.38	2.50	2.73	3.45	4.22	
	30	1.85	1.91	2.12	2.24	2.37	2.50	2.78	2.93	3.22	4.14	5.11	
	40	2.01	2.08	2.35	2.50	2.65	2.82	3.15	3.33	3.68	4.78	5.94	
	60	2.27	2.40	2.76	2.97	3.18	3.39	3.84	4.06	4.52	5.96	7.45	
	70	2.39	2.54	2.96	3.19	3.42	3.66	4.16	4.41	4.92	6.51	8.16	
50	80	2.50	2.68	3.15	3.40	3.66	3.93	4.47	4.74	5.30	7.04	8.85	
	5	1.47	1.46	1.55	1.61	1.67	1.73	1.86	1.93	2.06	2.46	2.85	
	10	1.69	1.70	1.81	1.88	1.96	2.03	2.19	2.27	2.44	2.93	3.44	
	20	1.99	2.02	2.17	2.27	2.37	2.47	2.68	2.79	3.01	3.70	4.43	
	30	2.22	2.26	2.46	2.57	2.70	2.82	3.09	3.22	3.50	4.38	5.31	
	40	2.41	2.47	2.71	2.84	2.99	3.14	3.45	3.61	3.94	5.00	6.12	
	60	2.73	2.82	3.14	3.32	3.51	3.71	4.12	4.33	4.77	6.15	7.62	
	70	2.86	2.98	3.34	3.54	3.75	3.97	4.43	4.67	5.16	6.70	8.33	
100	80	3.00	3.13	3.53	3.75	3.99	4.23	4.74	5.00	5.53	7.22	9.01	
	5	1.67	1.66	1.76	1.82	1.89	1.96	2.09	2.16	2.30	2.72	3.13	
	10	1.95	1.96	2.08	2.15	2.23	2.31	2.48	2.56	2.74	3.25	3.77	
	20	2.33	2.35	2.51	2.61	2.71	2.82	3.03	3.14	3.37	4.05	4.76	
	30	2.60	2.64	2.84	2.96	3.08	3.21	3.47	3.60	3.88	4.73	5.63	
	40	2.83	2.88	3.12	3.26	3.40	3.55	3.85	4.01	4.33	5.34	6.42	
	60	3.21	3.30	3.60	3.77	3.96	4.14	4.53	4.74	5.15	6.48	7.90	
	70	3.38	3.48	3.81	4.01	4.21	4.41	4.85	5.07	5.53	7.01	8.59	
80	3.53	3.64	4.01	4.23	4.45	4.67	5.15	5.39	5.90	7.53	9.27		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.5 m (RADIUS = 7.4 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
150	5	1.81	1.81	1.91	1.98	2.04	2.12	2.26	2.33	2.48	2.91	3.34	
	10	2.14	2.14	2.27	2.35	2.43	2.52	2.69	2.78	2.96	3.49	4.02	
	20	2.57	2.59	2.75	2.86	2.96	3.07	3.30	3.41	3.64	4.34	5.05	
	30	2.88	2.92	3.12	3.24	3.37	3.50	3.77	3.90	4.18	5.03	5.92	
	40	3.14	3.19	3.43	3.57	3.72	3.87	4.17	4.33	4.65	5.65	6.71	
	60	3.57	3.65	3.95	4.12	4.31	4.49	4.88	5.08	5.49	6.78	8.17	
	70	3.75	3.84	4.18	4.37	4.57	4.78	5.20	5.42	5.87	7.31	8.86	
	80	3.92	4.03	4.39	4.60	4.82	5.04	5.51	5.75	6.24	7.82	9.52	
200	5	1.93	1.93	2.03	2.10	2.17	2.25	2.40	2.47	2.62	3.07	3.51	
	10	2.29	2.29	2.42	2.51	2.59	2.68	2.87	2.96	3.14	3.69	4.23	
	20	2.76	2.78	2.95	3.06	3.17	3.28	3.52	3.63	3.87	4.58	5.30	
	30	3.11	3.14	3.35	3.48	3.61	3.74	4.02	4.16	4.44	5.30	6.19	
	40	3.39	3.44	3.68	3.83	3.98	4.13	4.44	4.60	4.93	5.93	6.98	
	60	3.86	3.93	4.24	4.42	4.60	4.79	5.18	5.38	5.79	7.07	8.44	
	70	4.06	4.15	4.48	4.68	4.88	5.08	5.51	5.73	6.18	7.60	9.12	
	80	4.24	4.34	4.71	4.92	5.14	5.36	5.83	6.06	6.55	8.10	9.78	
250	5	2.03	2.03	2.14	2.21	2.28	2.36	2.51	2.59	2.75	3.21	3.66	
	10	2.42	2.42	2.56	2.64	2.73	2.83	3.01	3.11	3.30	3.86	4.42	
	20	2.93	2.95	3.13	3.24	3.35	3.47	3.71	3.83	4.07	4.80	5.53	
	30	3.30	3.33	3.55	3.68	3.81	3.95	4.23	4.37	4.66	5.54	6.43	
	40	3.61	3.65	3.90	4.05	4.20	4.36	4.68	4.84	5.17	6.18	7.23	
	60	4.11	4.18	4.49	4.67	4.86	5.05	5.44	5.65	6.06	7.33	8.69	
	70	4.32	4.41	4.75	4.94	5.15	5.36	5.79	6.01	6.45	7.86	9.37	
	80	4.52	4.62	4.99	5.20	5.42	5.64	6.11	6.35	6.83	8.37	10.02	
300	5	2.12	2.11	2.23	2.30	2.38	2.46	2.62	2.70	2.86	3.33	3.79	
	10	2.53	2.54	2.68	2.77	2.86	2.95	3.15	3.24	3.44	4.02	4.58	
	20	3.07	3.09	3.28	3.39	3.51	3.63	3.87	4.00	4.24	4.99	5.73	
	30	3.47	3.50	3.73	3.86	4.00	4.14	4.42	4.57	4.86	5.75	6.65	
	40	3.80	3.84	4.10	4.25	4.40	4.56	4.89	5.06	5.39	6.41	7.47	
	60	4.33	4.40	4.71	4.90	5.09	5.28	5.68	5.89	6.30	7.58	8.93	
	70	4.55	4.64	4.98	5.18	5.39	5.60	6.03	6.26	6.71	8.12	9.61	
	80	4.76	4.86	5.23	5.45	5.67	5.90	6.37	6.61	7.09	8.63	10.26	
400	5	2.27	2.27	2.39	2.46	2.54	2.63	2.79	2.88	3.05	3.54	4.02	
	10	2.73	2.73	2.88	2.97	3.07	3.17	3.38	3.48	3.68	4.28	4.87	
	20	3.33	3.35	3.54	3.66	3.78	3.91	4.17	4.29	4.55	5.32	6.09	
	30	3.76	3.80	4.03	4.17	4.31	4.46	4.76	4.91	5.21	6.13	7.05	
	40	4.12	4.17	4.43	4.59	4.75	4.92	5.26	5.43	5.78	6.82	7.89	
	60	4.70	4.78	5.10	5.29	5.49	5.69	6.10	6.31	6.73	8.03	9.38	
	70	4.95	5.04	5.39	5.60	5.81	6.03	6.47	6.70	7.16	8.58	10.06	
	80	5.18	5.28	5.66	5.88	6.11	6.34	6.82	7.06	7.56	9.10	10.72	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.5 m (RADIUS = 7.4 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2} 0	5	1.31	1.37	1.56	1.66	1.77	1.88	2.10	2.21	2.43	3.11	3.80
	10	1.51	1.63	1.91	2.06	2.21	2.36	2.66	2.82	3.13	4.07	5.03
	20	1.86	2.07	2.51	2.73	2.95	3.17	3.62	3.84	4.30	5.68	7.11
	30	2.16	2.45	3.03	3.31	3.60	3.88	4.45	4.74	5.32	7.09	8.92
	40	2.44	2.81	3.51	3.85	4.19	4.54	5.22	5.57	6.26	8.39	10.59
	60	2.94	3.46	4.39	4.84	5.29	5.73	6.63	7.08	7.98	10.77	13.65
	70	3.18	3.76	4.80	5.30	5.80	6.29	7.28	7.78	8.79	11.88	15.08
	80	3.41	4.05	5.19	5.74	6.29	6.83	7.92	8.46	9.56	12.95	16.46
10	5	1.65	1.66	1.80	1.89	1.98	2.07	2.27	2.38	2.59	3.24	3.91
	10	1.89	1.93	2.14	2.27	2.40	2.53	2.82	2.96	3.26	4.17	5.12
	20	2.24	2.35	2.71	2.91	3.11	3.32	3.75	3.96	4.41	5.77	7.18
	30	2.53	2.72	3.21	3.48	3.74	4.02	4.57	4.85	5.42	7.17	8.99
	40	2.79	3.06	3.68	4.00	4.33	4.66	5.33	5.67	6.35	8.46	10.66
	60	3.28	3.68	4.54	4.98	5.41	5.85	6.72	7.17	8.07	10.83	13.71
	70	3.50	3.98	4.95	5.43	5.92	6.40	7.38	7.87	8.87	11.94	15.13
	80	3.72	4.26	5.34	5.87	6.40	6.94	8.01	8.55	9.64	13.01	16.51
20	5	1.82	1.82	1.96	2.04	2.13	2.23	2.42	2.52	2.72	3.35	4.01
	10	2.09	2.12	2.32	2.44	2.56	2.69	2.96	3.10	3.38	4.28	5.21
	20	2.49	2.58	2.89	3.08	3.27	3.46	3.87	4.08	4.51	5.86	7.26
	30	2.80	2.95	3.39	3.63	3.89	4.15	4.69	4.96	5.52	7.25	9.06
	40	3.08	3.29	3.85	4.15	4.47	4.79	5.44	5.77	6.45	8.54	10.72
	60	3.57	3.90	4.70	5.11	5.53	5.96	6.82	7.26	8.15	10.90	13.76
	70	3.79	4.19	5.10	5.56	6.03	6.51	7.47	7.96	8.95	12.00	15.19
	80	4.01	4.47	5.48	6.00	6.52	7.04	8.10	8.64	9.72	13.07	16.56
50	5	2.11	2.12	2.25	2.34	2.44	2.53	2.73	2.83	3.04	3.66	4.29
	10	2.47	2.50	2.69	2.80	2.93	3.05	3.31	3.45	3.72	4.57	5.47
	20	2.96	3.03	3.32	3.49	3.66	3.85	4.23	4.43	4.83	6.11	7.48
	30	3.34	3.45	3.84	4.06	4.29	4.52	5.02	5.28	5.81	7.49	9.26
	40	3.66	3.82	4.30	4.57	4.85	5.15	5.76	6.07	6.72	8.76	10.91
	60	4.21	4.46	5.13	5.51	5.89	6.29	7.11	7.54	8.40	11.10	13.93
	70	4.45	4.75	5.52	5.95	6.38	6.83	7.75	8.23	9.19	12.20	15.35
	80	4.69	5.03	5.90	6.37	6.86	7.35	8.37	8.89	9.95	13.26	16.72
100	5	2.42	2.42	2.57	2.66	2.76	2.87	3.07	3.18	3.39	4.03	4.67
	10	2.87	2.89	3.09	3.21	3.33	3.46	3.73	3.87	4.14	4.99	5.86
	20	3.47	3.53	3.81	3.98	4.15	4.33	4.71	4.90	5.29	6.52	7.84
	30	3.92	4.02	4.38	4.59	4.81	5.04	5.52	5.76	6.27	7.87	9.59
	40	4.30	4.43	4.88	5.13	5.40	5.67	6.25	6.55	7.16	9.12	11.22
	60	4.93	5.14	5.75	6.09	6.44	6.81	7.58	7.98	8.81	11.43	14.21
	70	5.21	5.45	6.14	6.53	6.93	7.34	8.21	8.66	9.58	12.51	15.62
	80	5.47	5.75	6.52	6.95	7.39	7.86	8.82	9.31	10.34	13.57	16.98

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.5 m (RADIUS = 7.4 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s)^{1/2}

	1	2	4	5	6	7	9	10	12	18	24
150	2.64	2.64	2.80	2.90	3.00	3.11	3.33	3.44	3.66	4.32	4.98
	3.15	3.17	3.38	3.50	3.64	3.77	4.05	4.19	4.47	5.33	6.20
	3.84	3.89	4.18	4.35	4.53	4.71	5.09	5.28	5.67	6.89	8.18
	4.34	4.43	4.80	5.01	5.23	5.46	5.93	6.17	6.67	8.24	9.91
	4.76	4.89	5.33	5.58	5.84	6.11	6.68	6.97	7.56	9.47	11.52
	5.47	5.66	6.24	6.57	6.92	7.27	8.02	8.40	9.20	11.75	14.49
	5.77	5.99	6.65	7.02	7.41	7.81	8.64	9.07	9.97	12.83	15.89
	6.06	6.31	7.04	7.45	7.88	8.32	9.24	9.72	10.71	13.87	17.24
200	2.82	2.82	2.99	3.09	3.20	3.31	3.53	3.65	3.88	4.56	5.23
	3.38	3.40	3.62	3.75	3.88	4.02	4.31	4.45	4.74	5.62	6.50
	4.13	4.19	4.48	4.66	4.84	5.03	5.41	5.61	6.00	7.22	8.50
	4.69	4.77	5.14	5.36	5.58	5.81	6.29	6.53	7.02	8.58	10.23
	5.15	5.26	5.70	5.96	6.22	6.49	7.05	7.34	7.93	9.81	11.82
	5.91	6.08	6.66	6.99	7.33	7.68	8.41	8.79	9.57	12.07	14.77
	6.23	6.44	7.09	7.45	7.83	8.23	9.04	9.46	10.34	13.14	16.16
	6.54	6.78	7.50	7.90	8.31	8.74	9.64	10.11	11.08	14.17	17.50
250	2.97	2.98	3.15	3.25	3.36	3.48	3.71	3.83	4.06	4.76	5.45
	3.58	3.60	3.82	3.95	4.10	4.24	4.53	4.68	4.98	5.87	6.77
	4.39	4.44	4.74	4.92	5.11	5.30	5.69	5.89	6.29	7.52	8.80
	4.98	5.07	5.44	5.66	5.89	6.12	6.60	6.84	7.34	8.89	10.53
	5.47	5.59	6.03	6.29	6.55	6.83	7.39	7.68	8.27	10.13	12.12
	6.28	6.45	7.03	7.36	7.70	8.05	8.78	9.15	9.92	12.38	15.05
	6.63	6.83	7.48	7.84	8.22	8.60	9.41	9.83	10.69	13.44	16.43
	6.96	7.19	7.89	8.29	8.70	9.13	10.02	10.48	11.42	14.47	17.76
300	3.11	3.11	3.29	3.40	3.51	3.63	3.87	3.99	4.23	4.95	5.65
	3.76	3.78	4.00	4.14	4.28	4.43	4.73	4.88	5.19	6.10	7.01
	4.61	4.67	4.97	5.16	5.35	5.54	5.94	6.14	6.55	7.80	9.08
	5.24	5.33	5.71	5.93	6.16	6.40	6.88	7.13	7.63	9.18	10.82
	5.76	5.87	6.32	6.58	6.85	7.13	7.70	7.99	8.58	10.43	12.40
	6.62	6.78	7.36	7.69	8.03	8.38	9.11	9.48	10.25	12.69	15.32
	6.98	7.18	7.82	8.19	8.56	8.95	9.75	10.17	11.02	13.74	16.69
	7.33	7.55	8.25	8.65	9.06	9.49	10.37	10.82	11.76	14.76	18.02
400	3.34	3.35	3.53	3.64	3.76	3.89	4.14	4.27	4.52	5.26	5.99
	4.06	4.08	4.31	4.46	4.61	4.76	5.08	5.24	5.55	6.50	7.44
	5.00	5.05	5.38	5.57	5.76	5.97	6.38	6.59	7.01	8.28	9.58
	5.69	5.78	6.17	6.40	6.64	6.88	7.38	7.63	8.14	9.72	11.35
	6.26	6.37	6.83	7.10	7.37	7.66	8.24	8.53	9.13	10.99	12.94
	7.20	7.36	7.94	8.28	8.62	8.98	9.71	10.08	10.85	13.26	15.84
	7.60	7.79	8.43	8.80	9.18	9.57	10.37	10.78	11.63	14.31	17.21
	7.97	8.18	8.89	9.29	9.70	10.12	11.00	11.45	12.38	15.33	18.52

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.5 m (RADIUS = 7.4 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
0	5	1.93	2.06	2.41	2.59	2.77	2.96	3.33	3.52	3.90	5.06	6.24	
	10	2.34	2.59	3.12	3.38	3.65	3.92	4.47	4.74	5.29	6.98	8.71	
	20	3.03	3.47	4.31	4.72	5.13	5.55	6.37	6.79	7.63	10.20	12.86	
	30	3.63	4.24	5.35	5.89	6.43	6.97	8.04	8.59	9.68	13.02	16.49	
	40	4.19	4.95	6.31	6.97	7.62	8.27	9.58	10.24	11.56	15.62	19.83	
	60	5.20	6.24	8.07	8.94	9.81	10.67	12.39	13.26	15.00	20.37	25.94	
	70	5.68	6.85	8.89	9.86	10.83	11.79	13.70	14.67	16.61	22.59	28.80	
	80	6.13	7.43	9.68	10.75	11.81	12.86	14.97	16.03	18.16	24.73	31.56	
10	5	2.38	2.42	2.68	2.83	3.00	3.17	3.52	3.69	4.06	5.19	6.35	
	10	2.79	2.93	3.36	3.60	3.85	4.10	4.62	4.89	5.42	7.08	8.80	
	20	3.45	3.76	4.51	4.90	5.30	5.70	6.50	6.91	7.74	10.29	12.93	
	30	4.03	4.51	5.54	6.06	6.58	7.10	8.16	8.70	9.78	13.10	16.56	
	40	4.56	5.20	6.49	7.12	7.76	8.40	9.69	10.34	11.65	15.69	19.89	
	60	5.54	6.47	8.23	9.08	9.93	10.78	12.49	13.35	15.09	20.44	26.00	
	70	6.00	7.07	9.04	10.00	10.95	11.89	13.80	14.76	16.69	22.65	28.86	
	80	6.45	7.65	9.83	10.88	11.93	12.97	15.06	16.12	18.24	24.79	31.61	
20	5	2.62	2.65	2.89	3.04	3.19	3.35	3.69	3.86	4.21	5.31	6.45	
	10	3.09	3.19	3.57	3.80	4.03	4.27	4.77	5.03	5.55	7.19	8.89	
	20	3.79	4.04	4.71	5.08	5.46	5.84	6.63	7.03	7.85	10.38	13.01	
	30	4.37	4.77	5.72	6.22	6.73	7.24	8.28	8.81	9.88	13.18	16.63	
	40	4.90	5.45	6.66	7.27	7.90	8.53	9.80	10.44	11.74	15.77	19.96	
	60	5.87	6.70	8.38	9.22	10.05	10.89	12.59	13.44	15.17	20.50	26.06	
	70	6.32	7.29	9.19	10.13	11.07	12.00	13.89	14.85	16.77	22.72	28.91	
	80	6.76	7.86	9.97	11.01	12.04	13.08	15.16	16.20	18.32	24.86	31.66	
50	5	3.07	3.10	3.33	3.47	3.63	3.78	4.10	4.27	4.61	5.66	6.76	
	10	3.66	3.73	4.08	4.29	4.50	4.73	5.19	5.43	5.93	7.49	9.15	
	20	4.49	4.67	5.25	5.57	5.92	6.27	7.01	7.39	8.17	10.64	13.23	
	30	5.14	5.43	6.24	6.69	7.15	7.63	8.63	9.13	10.17	13.42	16.83	
	40	5.70	6.11	7.15	7.72	8.30	8.90	10.12	10.75	12.02	15.99	20.14	
	60	6.70	7.35	8.84	9.62	10.42	11.23	12.88	13.72	15.42	20.70	26.23	
	70	7.16	7.92	9.63	10.52	11.42	12.33	14.18	15.11	17.02	22.91	29.07	
	80	7.60	8.48	10.40	11.39	12.39	13.39	15.43	16.46	18.56	25.04	31.82	
100	5	3.54	3.56	3.80	3.95	4.11	4.27	4.60	4.77	5.11	6.15	7.23	
	10	4.26	4.32	4.67	4.87	5.09	5.31	5.76	6.00	6.48	7.98	9.58	
	20	5.24	5.40	5.93	6.24	6.57	6.90	7.60	7.96	8.70	11.07	13.60	
	30	6.00	6.24	6.97	7.38	7.81	8.25	9.18	9.67	10.66	13.81	17.16	
	40	6.64	6.97	7.89	8.40	8.94	9.50	10.65	11.25	12.48	16.35	20.46	
	60	7.73	8.25	9.56	10.28	11.02	11.79	13.37	14.18	15.84	21.04	26.51	
	70	8.22	8.84	10.34	11.16	12.00	12.87	14.65	15.56	17.42	23.23	29.35	
	80	8.69	9.40	11.10	12.01	12.95	13.91	15.88	16.89	18.94	25.35	32.09	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.5 m (RADIUS = 7.4 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
150	5	3.88	3.90	4.15	4.31	4.47	4.64	4.98	5.15	5.50	6.56	7.64	
	10	4.69	4.76	5.11	5.31	5.53	5.76	6.22	6.45	6.93	8.42	9.99	
	20	5.80	5.94	6.47	6.78	7.09	7.42	8.11	8.46	9.18	11.48	13.96	
	30	6.63	6.85	7.56	7.96	8.37	8.80	9.70	10.17	11.13	14.20	17.50	
	40	7.33	7.64	8.51	9.00	9.52	10.05	11.16	11.73	12.92	16.72	20.77	
	60	8.52	8.98	10.21	10.89	11.59	12.32	13.84	14.63	16.25	21.37	26.79	
	70	9.05	9.59	10.99	11.76	12.56	13.39	15.11	15.99	17.81	23.55	29.62	
	80	9.54	10.17	11.74	12.61	13.50	14.42	16.33	17.32	19.33	25.66	32.35	
200	5	4.15	4.18	4.44	4.60	4.76	4.94	5.29	5.46	5.82	6.90	7.99	
	10	5.05	5.11	5.47	5.68	5.90	6.13	6.60	6.84	7.32	8.81	10.37	
	20	6.25	6.39	6.92	7.23	7.54	7.87	8.55	8.90	9.62	11.89	14.32	
	30	7.15	7.36	8.06	8.45	8.86	9.29	10.17	10.63	11.57	14.58	17.83	
	40	7.91	8.19	9.05	9.53	10.03	10.55	11.63	12.20	13.36	17.08	21.08	
	60	9.18	9.61	10.79	11.44	12.12	12.83	14.31	15.07	16.65	21.69	27.07	
	70	9.73	10.24	11.58	12.32	13.09	13.89	15.56	16.42	18.20	23.87	29.89	
	80	10.25	10.84	12.34	13.16	14.03	14.92	16.77	17.73	19.71	25.97	32.61	
250	5	4.39	4.41	4.68	4.84	5.02	5.19	5.55	5.74	6.10	7.20	8.31	
	10	5.35	5.41	5.78	5.99	6.22	6.45	6.93	7.17	7.66	9.17	10.72	
	20	6.64	6.77	7.31	7.62	7.94	8.27	8.95	9.30	10.02	12.26	14.67	
	30	7.60	7.80	8.50	8.89	9.30	9.73	10.60	11.05	11.98	14.95	18.15	
	40	8.40	8.68	9.52	10.00	10.50	11.01	12.08	12.63	13.77	17.43	21.38	
	60	9.74	10.15	11.30	11.95	12.61	13.30	14.75	15.50	17.05	22.02	27.35	
	70	10.33	10.81	12.11	12.83	13.59	14.37	16.00	16.85	18.59	24.18	30.16	
	80	10.87	11.43	12.88	13.69	14.52	15.39	17.21	18.15	20.09	26.27	32.87	
300	5	4.60	4.62	4.89	5.06	5.24	5.42	5.79	5.98	6.35	7.48	8.60	
	10	5.62	5.68	6.05	6.27	6.51	6.74	7.23	7.48	7.97	9.49	11.05	
	20	6.98	7.11	7.66	7.97	8.29	8.63	9.32	9.67	10.38	12.62	15.01	
	30	8.00	8.20	8.89	9.29	9.70	10.12	11.00	11.45	12.37	15.31	18.47	
	40	8.84	9.11	9.95	10.43	10.92	11.43	12.49	13.04	14.17	17.78	21.69	
	60	10.25	10.64	11.78	12.41	13.07	13.75	15.17	15.91	17.44	22.34	27.63	
	70	10.86	11.32	12.60	13.31	14.05	14.82	16.42	17.25	18.97	24.50	30.43	
	80	11.43	11.96	13.38	14.17	14.99	15.85	17.63	18.55	20.46	26.58	33.13	
400	5	4.96	4.98	5.27	5.44	5.63	5.82	6.20	6.40	6.79	7.95	9.10	
	10	6.08	6.14	6.53	6.76	7.00	7.25	7.75	8.01	8.52	10.07	11.65	
	20	7.58	7.71	8.26	8.58	8.92	9.26	9.96	10.32	11.04	13.29	15.65	
	30	8.69	8.88	9.58	9.98	10.40	10.83	11.71	12.16	13.08	15.99	19.10	
	40	9.61	9.86	10.70	11.18	11.68	12.19	13.25	13.79	14.90	18.45	22.29	
	60	11.12	11.50	12.62	13.25	13.90	14.57	15.97	16.69	18.18	22.98	28.19	
	70	11.78	12.22	13.48	14.18	14.90	15.66	17.22	18.03	19.71	25.12	30.96	
	80	12.39	12.89	14.29	15.06	15.86	16.69	18.43	19.33	21.19	27.18	33.65	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.5 m (RADIUS = 7.4 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	5	2.96	3.24	3.88	4.21	4.54	4.87	5.53	5.86	6.54	8.59	10.70	
	10	3.78	4.29	5.30	5.80	6.30	6.80	7.80	8.30	9.32	12.42	15.63	
	20	5.15	6.05	7.69	8.48	9.26	10.04	11.61	12.40	13.99	18.87	23.92	
	30	6.36	7.59	9.78	10.82	11.86	12.89	14.95	15.99	18.08	24.52	31.19	
	40	7.47	9.01	11.70	12.97	14.24	15.50	18.02	19.29	21.84	29.71	37.87	
	60	9.50	11.61	15.21	16.92	18.61	20.28	23.64	25.33	28.73	39.21	50.10	
	70	10.45	12.82	16.85	18.76	20.65	22.52	26.27	28.15	31.95	43.65	55.81	
	80	11.36	13.99	18.44	20.54	22.61	24.68	28.80	30.88	35.06	47.93	61.33	
10	5	3.49	3.65	4.17	4.46	4.77	5.08	5.71	6.04	6.69	8.72	10.81	
	10	4.28	4.65	5.54	6.01	6.49	6.97	7.95	8.45	9.45	12.53	15.72	
	20	5.59	6.35	7.89	8.66	9.42	10.19	11.74	12.52	14.10	18.96	24.00	
	30	6.76	7.87	9.96	10.98	12.00	13.02	15.07	16.10	18.18	24.60	31.26	
	40	7.84	9.27	11.87	13.13	14.38	15.63	18.13	19.39	21.94	29.78	37.93	
	60	9.84	11.84	15.37	17.06	18.73	20.40	23.74	25.42	28.82	39.27	50.16	
	70	10.77	13.04	17.00	18.89	20.77	22.63	26.37	28.24	32.03	43.71	55.87	
	80	11.68	14.20	18.58	20.67	22.73	24.78	28.90	30.97	35.14	47.99	61.38	
20	5	3.85	3.96	4.43	4.70	4.99	5.28	5.89	6.21	6.85	8.84	10.91	
	10	4.68	4.97	5.78	6.23	6.68	7.15	8.11	8.59	9.58	12.63	15.81	
	20	6.00	6.65	8.09	8.84	9.59	10.34	11.87	12.64	14.21	19.04	24.07	
	30	7.15	8.14	10.15	11.15	12.15	13.16	15.19	16.21	18.28	24.68	31.33	
	40	8.21	9.52	12.04	13.28	14.51	15.75	18.24	19.50	22.03	29.85	38.00	
	60	10.17	12.07	15.52	17.19	18.85	20.51	23.84	25.52	28.90	39.34	50.21	
	70	11.10	13.26	17.15	19.03	20.89	22.74	26.46	28.33	32.12	43.78	55.92	
	80	11.99	14.42	18.73	20.80	22.85	24.89	28.99	31.05	35.22	48.06	61.43	
50	5	4.52	4.61	5.03	5.29	5.55	5.82	6.39	6.69	7.29	9.20	11.22	
	10	5.51	5.72	6.42	6.81	7.23	7.66	8.56	9.02	9.96	12.94	16.07	
	20	6.96	7.44	8.68	9.36	10.06	10.78	12.26	13.01	14.54	19.31	24.30	
	30	8.14	8.91	10.69	11.63	12.59	13.56	15.54	16.54	18.58	24.91	31.53	
	40	9.21	10.25	12.55	13.73	14.92	16.13	18.57	19.80	22.31	30.08	38.19	
	60	11.14	12.74	15.99	17.60	19.22	20.85	24.14	25.80	29.15	39.54	50.38	
	70	12.04	13.92	17.60	19.42	21.24	23.07	26.75	28.60	32.36	43.97	56.09	
	80	12.91	15.05	19.16	21.18	23.19	25.21	29.26	31.31	35.45	48.24	61.59	
100	5	5.23	5.31	5.73	5.98	6.24	6.51	7.07	7.36	7.94	9.78	11.73	
	10	6.41	6.59	7.24	7.61	8.00	8.41	9.25	9.69	10.59	13.45	16.51	
	20	8.07	8.46	9.56	10.18	10.82	11.49	12.88	13.60	15.08	19.74	24.67	
	30	9.37	9.98	11.55	12.41	13.30	14.22	16.11	17.09	19.08	25.31	31.87	
	40	10.50	11.34	13.38	14.47	15.59	16.74	19.11	20.31	22.77	30.44	38.50	
	60	12.50	13.81	16.75	18.28	19.84	21.41	24.63	26.26	29.57	39.87	50.67	
	70	13.41	14.96	18.34	20.07	21.83	23.61	27.22	29.05	32.76	44.29	56.36	
	80	14.29	16.08	19.88	21.81	23.76	25.73	29.72	31.74	35.84	48.55	61.86	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.5 m (RADIUS = 7.4 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s)^{1/2}

	1	2	4	5	6	7	9	10	12	18	24
150	5.75 7.07 8.90 10.31 11.52 13.61 14.56 15.46	5.82 7.23 9.25 10.85 12.26 14.77 15.92 17.03	6.25 7.87 10.30 12.32 14.15 17.49 19.06 20.58	6.51 8.24 10.89 13.13 15.18 18.94 20.72 22.44	6.77 8.63 11.51 13.98 16.25 20.44 22.42 24.33	7.05 9.03 12.15 14.85 17.35 21.97 24.15 26.25	7.61 9.86 13.49 16.68 19.64 25.11 27.69 30.18	7.90 10.28 14.18 17.62 20.82 26.72 29.49 32.17	8.48 11.16 15.61 19.56 23.23 29.99 33.16 36.23	10.31 13.95 20.17 25.70 30.81 40.21 44.61 48.86	12.22 16.95 25.04 32.20 38.81 50.95 56.63 62.12
200	6.17 7.61 9.58 11.09 12.37 14.56 15.54 16.47	6.24 7.76 9.91 11.59 13.06 15.62 16.79 17.91	6.68 8.41 10.94 13.00 14.85 18.19 19.75 21.26	6.94 8.78 11.52 13.79 15.84 19.59 21.35 23.05	7.21 9.17 12.12 14.61 16.87 21.04 22.99 24.89	7.49 9.56 12.75 15.46 17.94 22.52 24.68 26.77	8.07 10.39 14.05 17.23 20.17 25.60 28.15 30.63	8.36 10.81 14.73 18.15 21.32 27.17 29.93 32.60	8.95 11.68 16.13 20.05 23.68 30.40 33.56 36.62	10.77 14.43 20.60 26.09 31.18 40.54 44.93 49.17	12.67 17.37 25.41 32.54 39.12 51.23 56.91 62.38
250	6.53 8.07 10.17 11.76 13.11 15.39 16.41 17.36	6.60 8.22 10.49 12.24 13.76 16.39 17.58 18.72	7.05 8.87 11.50 13.62 15.50 18.86 20.42 21.93	7.31 9.24 12.08 14.39 16.46 20.21 21.96 23.66	7.59 9.64 12.68 15.19 17.46 21.61 23.56 25.45	7.88 10.04 13.29 16.02 18.51 23.06 25.21 27.29	8.46 10.87 14.58 17.76 20.68 26.07 28.62 31.08	8.76 11.29 15.25 18.66 21.81 27.63 30.37 33.03	9.36 12.15 16.62 20.52 24.13 30.81 33.96 37.00	11.20 14.88 21.02 26.48 31.54 40.87 45.25 49.48	13.10 17.79 25.77 32.87 39.44 51.52 57.18 62.65
300	6.85 8.48 10.69 12.36 13.76 16.14 17.19 18.17	6.92 8.63 11.00 12.83 14.39 17.09 18.30 19.46	7.37 9.28 12.01 14.19 16.09 19.49 21.05 22.56	7.65 9.66 12.59 14.94 17.04 20.80 22.55 24.24	7.93 10.06 13.18 15.74 18.02 22.17 24.11 25.99	8.22 10.46 13.80 16.56 19.05 23.59 25.73 27.79	8.82 11.30 15.07 18.26 21.18 26.55 29.08 31.53	9.12 11.72 15.73 19.15 22.29 28.08 30.81 33.45	9.73 12.59 17.09 20.98 24.57 31.22 34.35 37.38	11.58 15.31 21.44 26.87 31.90 41.20 45.57 49.79	13.49 18.19 26.13 33.20 39.75 51.80 57.45 62.91
400	7.40 9.19 11.60 13.40 14.91 17.45 18.56 19.60	7.47 9.33 11.89 13.84 15.50 18.33 19.60 20.79	7.94 10.00 12.91 15.19 17.17 20.64 22.23 23.75	8.22 10.39 13.48 15.94 18.09 21.91 23.67 25.36	8.52 10.80 14.08 16.72 19.06 23.23 25.17 27.04	8.82 11.21 14.70 17.53 20.05 24.61 26.73 28.78	9.44 12.06 15.97 19.21 22.13 27.47 29.98 32.41	9.75 12.49 16.62 20.08 23.21 28.96 31.67 34.29	10.37 13.37 17.96 21.87 25.44 32.03 35.14 38.15	12.27 16.09 22.24 27.63 32.62 41.85 46.20 50.40	14.20 18.95 26.85 33.86 40.36 52.36 57.99 63.44

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.0 m (RADIUS = 7.8 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0	°C												
	5	0.95	0.97	1.08	1.14	1.21	1.27	1.41	1.48	1.61	2.03	2.45	
	10	1.06	1.11	1.26	1.35	1.43	1.52	1.70	1.79	1.97	2.52	3.07	
	20	1.24	1.34	1.57	1.69	1.82	1.94	2.19	2.31	2.57	3.34	4.13	
	30	1.40	1.54	1.84	2.00	2.15	2.31	2.62	2.78	3.09	4.06	5.05	
	40	1.54	1.72	2.09	2.27	2.46	2.64	3.01	3.20	3.57	4.72	5.90	
	60	1.81	2.06	2.55	2.78	3.02	3.26	3.73	3.97	4.45	5.93	7.45	
	70	1.93	2.22	2.76	3.02	3.28	3.55	4.07	4.34	4.87	6.49	8.18	
80	2.05	2.37	2.96	3.25	3.54	3.82	4.40	4.69	5.26	7.04	8.88		
10	5	1.21	1.20	1.28	1.34	1.39	1.45	1.57	1.63	1.76	2.15	2.55	
	10	1.36	1.36	1.47	1.54	1.61	1.69	1.85	1.93	2.10	2.62	3.16	
	20	1.56	1.60	1.77	1.87	1.98	2.09	2.32	2.44	2.68	3.43	4.20	
	30	1.73	1.79	2.02	2.16	2.30	2.44	2.74	2.89	3.19	4.14	5.12	
	40	1.87	1.97	2.26	2.43	2.60	2.77	3.12	3.30	3.67	4.79	5.96	
	60	2.12	2.29	2.70	2.92	3.15	3.37	3.83	4.07	4.54	6.00	7.51	
	70	2.24	2.44	2.91	3.16	3.41	3.66	4.17	4.43	4.95	6.56	8.23	
	80	2.36	2.58	3.11	3.38	3.66	3.93	4.49	4.77	5.34	7.10	8.93	
20	5	1.32	1.31	1.39	1.45	1.50	1.56	1.69	1.75	1.87	2.26	2.65	
	10	1.50	1.50	1.61	1.67	1.75	1.82	1.98	2.05	2.22	2.72	3.25	
	20	1.74	1.76	1.92	2.02	2.12	2.22	2.44	2.55	2.79	3.51	4.28	
	30	1.92	1.97	2.18	2.31	2.44	2.57	2.85	3.00	3.29	4.22	5.19	
	40	2.08	2.16	2.42	2.57	2.73	2.89	3.23	3.40	3.76	4.87	6.02	
	60	2.36	2.49	2.85	3.06	3.27	3.49	3.93	4.16	4.62	6.06	7.57	
	70	2.48	2.64	3.06	3.29	3.52	3.77	4.26	4.52	5.03	6.63	8.29	
	80	2.60	2.78	3.25	3.51	3.77	4.04	4.58	4.86	5.42	7.17	8.98	
50	5	1.53	1.51	1.60	1.66	1.72	1.78	1.91	1.97	2.10	2.50	2.89	
	10	1.76	1.76	1.86	1.93	2.01	2.08	2.24	2.32	2.48	2.98	3.49	
	20	2.07	2.09	2.24	2.33	2.43	2.53	2.74	2.85	3.07	3.76	4.50	
	30	2.30	2.34	2.53	2.65	2.77	2.90	3.16	3.29	3.57	4.45	5.39	
	40	2.50	2.55	2.79	2.93	3.07	3.22	3.53	3.70	4.03	5.09	6.21	
	60	2.83	2.92	3.24	3.42	3.61	3.81	4.22	4.43	4.87	6.26	7.74	
	70	2.97	3.08	3.44	3.65	3.86	4.08	4.54	4.78	5.27	6.82	8.45	
	80	3.11	3.24	3.64	3.86	4.10	4.35	4.85	5.12	5.66	7.35	9.14	
100	5	1.73	1.72	1.81	1.87	1.94	2.00	2.14	2.21	2.35	2.76	3.17	
	10	2.02	2.02	2.14	2.21	2.29	2.37	2.54	2.62	2.79	3.30	3.82	
	20	2.41	2.43	2.58	2.68	2.78	2.89	3.10	3.21	3.43	4.12	4.83	
	30	2.70	2.73	2.92	3.04	3.16	3.29	3.55	3.68	3.96	4.81	5.71	
	40	2.94	2.98	3.21	3.35	3.49	3.64	3.94	4.10	4.42	5.44	6.52	
	60	3.33	3.41	3.71	3.88	4.06	4.25	4.64	4.85	5.26	6.59	8.02	
	70	3.50	3.59	3.93	4.12	4.32	4.53	4.97	5.19	5.65	7.14	8.72	
	80	3.66	3.77	4.14	4.35	4.57	4.80	5.28	5.52	6.03	7.66	9.41	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.0 m (RADIUS = 7.8 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °C	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
150 (m*s) ^{1/2}	5	1.88	1.87	1.97	2.03	2.10	2.17	2.31	2.38	2.53	2.96	3.38
	10	2.22	2.21	2.33	2.41	2.50	2.58	2.75	2.84	3.02	3.55	4.08
	20	2.66	2.67	2.84	2.94	3.04	3.15	3.37	3.49	3.71	4.41	5.13
	30	2.98	3.01	3.21	3.33	3.46	3.59	3.86	3.99	4.27	5.12	6.01
	40	3.25	3.30	3.53	3.67	3.81	3.96	4.27	4.43	4.75	5.75	6.81
	60	3.70	3.77	4.07	4.24	4.42	4.61	5.00	5.20	5.61	6.90	8.30
	70	3.89	3.97	4.30	4.50	4.69	4.90	5.33	5.55	6.00	7.44	8.99
	80	4.06	4.16	4.53	4.73	4.95	5.18	5.64	5.88	6.38	7.96	9.67
200	5	2.00	1.99	2.09	2.16	2.23	2.30	2.45	2.53	2.68	3.12	3.56
	10	2.37	2.37	2.50	2.58	2.66	2.75	2.93	3.02	3.20	3.75	4.29
	20	2.86	2.87	3.04	3.15	3.25	3.37	3.60	3.71	3.95	4.66	5.38
	30	3.22	3.25	3.45	3.57	3.70	3.84	4.11	4.25	4.53	5.39	6.28
	40	3.51	3.55	3.79	3.93	4.08	4.23	4.55	4.71	5.03	6.04	7.09
	60	3.99	4.06	4.36	4.54	4.72	4.91	5.30	5.50	5.91	7.19	8.56
	70	4.20	4.28	4.62	4.81	5.01	5.22	5.64	5.86	6.31	7.73	9.26
	80	4.39	4.49	4.85	5.06	5.28	5.50	5.97	6.20	6.69	8.25	9.93
250	5	2.10	2.09	2.20	2.27	2.34	2.42	2.57	2.65	2.80	3.26	3.71
	10	2.50	2.50	2.63	2.72	2.81	2.90	3.08	3.18	3.37	3.93	4.48
	20	3.03	3.04	3.22	3.33	3.44	3.55	3.79	3.91	4.15	4.88	5.61
	30	3.42	3.44	3.65	3.78	3.91	4.05	4.33	4.47	4.76	5.63	6.52
	40	3.73	3.77	4.02	4.16	4.31	4.47	4.79	4.95	5.28	6.29	7.34
	60	4.25	4.32	4.62	4.80	4.99	5.18	5.57	5.77	6.18	7.46	8.82
	70	4.47	4.55	4.89	5.08	5.28	5.49	5.92	6.14	6.59	8.00	9.51
	80	4.68	4.77	5.13	5.34	5.56	5.79	6.25	6.49	6.98	8.52	10.18
300	5	2.20	2.19	2.29	2.36	2.44	2.52	2.67	2.75	2.91	3.38	3.84
	10	2.62	2.62	2.75	2.84	2.93	3.03	3.22	3.31	3.51	4.08	4.65
	20	3.18	3.20	3.37	3.48	3.60	3.72	3.96	4.08	4.33	5.07	5.81
	30	3.59	3.62	3.83	3.97	4.10	4.24	4.53	4.67	4.96	5.85	6.75
	40	3.93	3.97	4.22	4.37	4.52	4.68	5.00	5.17	5.50	6.52	7.58
	60	4.48	4.54	4.85	5.03	5.22	5.42	5.82	6.02	6.43	7.71	9.06
	70	4.71	4.79	5.13	5.33	5.53	5.74	6.18	6.40	6.85	8.26	9.75
	80	4.93	5.02	5.39	5.60	5.82	6.05	6.52	6.76	7.24	8.78	10.42
400	5	2.35	2.34	2.46	2.53	2.61	2.69	2.86	2.94	3.11	3.60	4.08
	10	2.82	2.82	2.97	3.06	3.15	3.25	3.45	3.55	3.76	4.36	4.94
	20	3.45	3.46	3.65	3.76	3.88	4.01	4.26	4.39	4.65	5.41	6.18
	30	3.90	3.92	4.15	4.28	4.43	4.57	4.87	5.02	5.32	6.23	7.15
	40	4.27	4.31	4.56	4.72	4.88	5.04	5.38	5.55	5.90	6.94	8.01
	60	4.87	4.93	5.25	5.44	5.63	5.83	6.24	6.45	6.87	8.17	9.52
	70	5.13	5.20	5.55	5.75	5.96	6.18	6.62	6.85	7.31	8.73	10.21
	80	5.36	5.45	5.83	6.04	6.27	6.50	6.98	7.22	7.72	9.26	10.88

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.0 m (RADIUS = 7.8 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	5	1.36	1.42	1.61	1.71	1.82	1.93	2.15	2.26	2.48	3.16	3.85	
	10	1.58	1.69	1.97	2.12	2.27	2.42	2.73	2.88	3.19	4.14	5.10	
	20	1.94	2.15	2.59	2.81	3.04	3.26	3.71	3.94	4.39	5.78	7.21	
	30	2.25	2.55	3.13	3.42	3.71	3.99	4.57	4.86	5.44	7.22	9.06	
	40	2.54	2.92	3.63	3.98	4.32	4.67	5.36	5.70	6.40	8.54	10.75	
	60	3.07	3.59	4.54	5.00	5.45	5.90	6.80	7.25	8.17	10.96	13.86	
	70	3.32	3.91	4.97	5.47	5.97	6.48	7.48	7.98	8.99	12.10	15.31	
	80	3.56	4.21	5.38	5.93	6.48	7.03	8.13	8.68	9.79	13.19	16.71	
10	5	1.72	1.72	1.85	1.94	2.03	2.13	2.33	2.43	2.64	3.29	3.96	
	10	1.96	2.00	2.21	2.33	2.46	2.60	2.89	3.03	3.33	4.25	5.19	
	20	2.33	2.44	2.80	3.00	3.20	3.41	3.84	4.06	4.50	5.87	7.29	
	30	2.63	2.82	3.32	3.59	3.86	4.13	4.69	4.97	5.54	7.30	9.13	
	40	2.90	3.17	3.80	4.13	4.46	4.79	5.47	5.81	6.50	8.62	10.82	
	60	3.41	3.83	4.70	5.14	5.57	6.01	6.90	7.35	8.25	11.03	13.92	
	70	3.65	4.13	5.12	5.61	6.10	6.59	7.57	8.07	9.07	12.16	15.37	
	80	3.88	4.43	5.52	6.06	6.60	7.14	8.22	8.77	9.87	13.25	16.77	
20	5	1.89	1.88	2.01	2.10	2.19	2.28	2.48	2.58	2.78	3.41	4.06	
	10	2.17	2.20	2.39	2.51	2.63	2.76	3.03	3.17	3.46	4.35	5.28	
	20	2.58	2.67	2.98	3.17	3.36	3.56	3.97	4.18	4.61	5.96	7.36	
	30	2.91	3.06	3.50	3.75	4.00	4.26	4.81	5.08	5.64	7.38	9.20	
	40	3.20	3.41	3.97	4.28	4.60	4.92	5.58	5.91	6.59	8.69	10.88	
	60	3.71	4.05	4.85	5.27	5.70	6.13	7.00	7.44	8.34	11.10	13.98	
	70	3.94	4.35	5.27	5.74	6.22	6.70	7.67	8.16	9.15	12.23	15.42	
	80	4.17	4.64	5.67	6.19	6.72	7.25	8.31	8.85	9.94	13.31	16.82	
50	5	2.19	2.19	2.32	2.41	2.50	2.60	2.79	2.89	3.10	3.72	4.35	
	10	2.56	2.58	2.77	2.88	3.00	3.13	3.39	3.52	3.80	4.65	5.55	
	20	3.07	3.14	3.42	3.59	3.77	3.95	4.33	4.53	4.93	6.22	7.59	
	30	3.46	3.57	3.96	4.18	4.41	4.65	5.15	5.41	5.94	7.62	9.40	
	40	3.80	3.95	4.43	4.71	4.99	5.29	5.90	6.22	6.87	8.92	11.07	
	60	4.37	4.62	5.30	5.67	6.07	6.47	7.30	7.72	8.59	11.30	14.15	
	70	4.62	4.92	5.70	6.13	6.57	7.02	7.95	8.43	9.40	12.42	15.59	
	80	4.86	5.21	6.09	6.57	7.06	7.56	8.59	9.11	10.18	13.50	16.98	
100	5	2.51	2.50	2.65	2.74	2.84	2.94	3.14	3.25	3.46	4.10	4.74	
	10	2.97	2.99	3.18	3.30	3.42	3.55	3.82	3.95	4.23	5.07	5.95	
	20	3.59	3.65	3.93	4.09	4.27	4.45	4.82	5.01	5.40	6.64	7.95	
	30	4.06	4.15	4.51	4.73	4.95	5.17	5.65	5.90	6.40	8.01	9.74	
	40	4.45	4.58	5.03	5.28	5.55	5.82	6.40	6.70	7.32	9.28	11.39	
	60	5.11	5.31	5.92	6.27	6.63	7.00	7.77	8.18	9.00	11.64	14.43	
	70	5.40	5.64	6.33	6.72	7.13	7.54	8.42	8.87	9.80	12.74	15.87	
	80	5.67	5.95	6.73	7.16	7.61	8.07	9.04	9.54	10.57	13.82	17.25	

SPACING = 11.0 m (RADIUS = 7.8 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 150	5	2.74	2.73	2.88	2.98	3.08	3.19	3.40	3.51	3.73	4.39	5.05	
	10	3.27	3.28	3.48	3.60	3.73	3.86	4.14	4.28	4.56	5.42	6.29	
	20	3.97	4.02	4.30	4.47	4.65	4.83	5.21	5.40	5.79	7.01	8.30	
	30	4.50	4.58	4.94	5.15	5.37	5.60	6.07	6.31	6.81	8.38	10.06	
	40	4.94	5.05	5.49	5.74	6.00	6.27	6.84	7.13	7.73	9.64	11.70	
	60	5.66	5.85	6.43	6.76	7.11	7.47	8.22	8.60	9.40	11.97	14.72	
	70	5.98	6.20	6.86	7.23	7.62	8.02	8.86	9.29	10.19	13.06	16.14	
	80	6.28	6.53	7.26	7.67	8.10	8.55	9.48	9.96	10.95	14.13	17.51	
200	5	2.92	2.92	3.07	3.17	3.28	3.39	3.61	3.73	3.95	4.63	5.30	
	10	3.50	3.52	3.72	3.85	3.98	4.12	4.41	4.55	4.84	5.71	6.60	
	20	4.28	4.33	4.62	4.79	4.97	5.15	5.54	5.73	6.13	7.35	8.63	
	30	4.85	4.93	5.30	5.51	5.73	5.96	6.43	6.68	7.17	8.73	10.38	
	40	5.33	5.44	5.88	6.13	6.39	6.66	7.22	7.51	8.10	9.98	12.00	
	60	6.12	6.29	6.86	7.19	7.53	7.89	8.62	9.00	9.78	12.29	15.00	
	70	6.46	6.66	7.31	7.67	8.05	8.44	9.26	9.69	10.56	13.38	16.41	
	80	6.77	7.01	7.72	8.13	8.54	8.98	9.88	10.35	11.32	14.43	17.78	
250	5	3.08	3.08	3.24	3.34	3.45	3.56	3.79	3.91	4.14	4.84	5.53	
	10	3.71	3.72	3.93	4.06	4.20	4.34	4.64	4.78	5.08	5.97	6.87	
	20	4.54	4.59	4.88	5.06	5.24	5.43	5.82	6.02	6.42	7.65	8.93	
	30	5.16	5.23	5.60	5.82	6.05	6.28	6.76	7.00	7.50	9.05	10.69	
	40	5.67	5.77	6.21	6.47	6.73	7.00	7.57	7.85	8.44	10.31	12.30	
	60	6.50	6.67	7.24	7.57	7.91	8.26	8.99	9.36	10.14	12.61	15.28	
	70	6.87	7.06	7.70	8.06	8.44	8.83	9.64	10.06	10.92	13.69	16.68	
	80	7.20	7.43	8.13	8.53	8.94	9.37	10.26	10.72	11.68	14.73	18.04	
300	5	3.22	3.22	3.38	3.49	3.60	3.72	3.95	4.07	4.31	5.03	5.73	
	10	3.89	3.90	4.12	4.25	4.40	4.54	4.84	4.99	5.29	6.20	7.11	
	20	4.78	4.82	5.12	5.30	5.49	5.68	6.08	6.28	6.69	7.93	9.21	
	30	5.43	5.50	5.88	6.10	6.32	6.56	7.04	7.29	7.79	9.35	10.98	
	40	5.97	6.07	6.51	6.77	7.04	7.31	7.88	8.17	8.76	10.61	12.59	
	60	6.85	7.01	7.58	7.91	8.25	8.60	9.33	9.70	10.47	12.91	15.55	
	70	7.23	7.42	8.06	8.42	8.80	9.18	9.99	10.40	11.26	13.99	16.95	
	80	7.58	7.80	8.50	8.90	9.31	9.73	10.62	11.07	12.01	15.03	18.30	
400	5	3.46	3.46	3.63	3.74	3.86	3.98	4.23	4.36	4.61	5.35	6.08	
	10	4.20	4.21	4.44	4.58	4.73	4.88	5.19	5.35	5.67	6.61	7.55	
	20	5.18	5.22	5.53	5.72	5.92	6.12	6.53	6.73	7.15	8.43	9.72	
	30	5.89	5.97	6.35	6.58	6.81	7.06	7.55	7.80	8.31	9.89	11.52	
	40	6.48	6.58	7.03	7.30	7.57	7.85	8.43	8.72	9.32	11.18	13.14	
	60	7.45	7.60	8.18	8.51	8.85	9.21	9.94	10.31	11.08	13.50	16.09	
	70	7.86	8.04	8.68	9.05	9.42	9.81	10.62	11.03	11.88	14.57	17.47	
	80	8.25	8.45	9.15	9.55	9.96	10.39	11.26	11.72	12.64	15.61	18.81	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.0 m (RADIUS = 7.8 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	5	2.01	2.14	2.49	2.67	2.85	3.04	3.42	3.61	3.99	5.15	6.33	
	10	2.44	2.69	3.22	3.49	3.76	4.03	4.58	4.86	5.41	7.10	8.84	
	20	3.16	3.60	4.46	4.87	5.29	5.71	6.54	6.96	7.80	10.39	13.05	
	30	3.79	4.41	5.54	6.09	6.63	7.17	8.26	8.80	9.90	13.27	16.75	
	40	4.37	5.14	6.53	7.20	7.86	8.52	9.83	10.49	11.83	15.91	20.14	
	60	5.43	6.49	8.35	9.24	10.11	10.98	12.72	13.59	15.35	20.75	26.35	
	70	5.92	7.13	9.21	10.19	11.17	12.13	14.07	15.04	17.00	23.02	29.25	
	80	6.40	7.74	10.03	11.11	12.18	13.25	15.37	16.44	18.59	25.20	32.06	
10	5	2.47	2.51	2.76	2.92	3.08	3.25	3.60	3.78	4.14	5.27	6.44	
	10	2.90	3.03	3.46	3.71	3.96	4.21	4.74	5.00	5.54	7.21	8.93	
	20	3.59	3.91	4.66	5.06	5.46	5.86	6.67	7.08	7.91	10.48	13.13	
	30	4.19	4.68	5.73	6.25	6.78	7.31	8.38	8.91	10.00	13.35	16.81	
	40	4.75	5.40	6.71	7.35	8.00	8.65	9.94	10.60	11.92	15.98	20.20	
	60	5.77	6.73	8.51	9.38	10.24	11.10	12.82	13.69	15.44	20.82	26.41	
	70	6.25	7.35	9.36	10.33	11.29	12.25	14.17	15.13	17.08	23.08	29.31	
	80	6.72	7.95	10.17	11.24	12.30	13.35	15.47	16.53	18.67	25.26	32.11	
20	5	2.72	2.75	2.98	3.13	3.28	3.44	3.77	3.95	4.30	5.40	6.55	
	10	3.21	3.30	3.69	3.91	4.15	4.39	4.89	5.15	5.67	7.31	9.02	
	20	3.94	4.18	4.87	5.24	5.62	6.01	6.80	7.21	8.03	10.56	13.20	
	30	4.54	4.95	5.91	6.42	6.93	7.44	8.49	9.03	10.10	13.43	16.88	
	40	5.09	5.65	6.88	7.51	8.14	8.77	10.06	10.70	12.01	16.06	20.27	
	60	6.10	6.96	8.67	9.52	10.36	11.21	12.92	13.78	15.52	20.89	26.47	
	70	6.58	7.57	9.51	10.46	11.41	12.36	14.26	15.23	17.17	23.15	29.37	
	80	7.04	8.17	10.32	11.37	12.42	13.46	15.56	16.62	18.75	25.33	32.16	
50	5	3.19	3.20	3.43	3.57	3.72	3.88	4.20	4.37	4.70	5.75	6.86	
	10	3.79	3.86	4.21	4.41	4.63	4.85	5.32	5.56	6.05	7.62	9.29	
	20	4.65	4.83	5.41	5.74	6.09	6.44	7.19	7.57	8.36	10.83	13.43	
	30	5.33	5.62	6.44	6.89	7.36	7.85	8.85	9.36	10.40	13.67	17.09	
	40	5.92	6.33	7.39	7.96	8.55	9.15	10.38	11.01	12.30	16.28	20.46	
	60	6.96	7.62	9.13	9.93	10.74	11.56	13.22	14.07	15.78	21.09	26.64	
	70	7.43	8.22	9.96	10.86	11.77	12.69	14.55	15.50	17.41	23.34	29.53	
	80	7.89	8.80	10.76	11.76	12.77	13.78	15.84	16.88	18.99	25.51	32.32	
100	5	3.67	3.68	3.92	4.06	4.22	4.38	4.71	4.87	5.21	6.26	7.33	
	10	4.41	4.47	4.81	5.01	5.22	5.44	5.90	6.13	6.61	8.12	9.72	
	20	5.43	5.58	6.12	6.42	6.75	7.08	7.78	8.14	8.89	11.26	13.80	
	30	6.21	6.45	7.18	7.60	8.03	8.48	9.41	9.90	10.90	14.06	17.43	
	40	6.88	7.21	8.14	8.66	9.20	9.76	10.92	11.52	12.76	16.66	20.77	
	60	8.02	8.54	9.87	10.59	11.35	12.12	13.71	14.53	16.20	21.43	26.93	
	70	8.53	9.15	10.68	11.51	12.36	13.23	15.03	15.95	17.82	23.67	29.81	
	80	9.01	9.73	11.46	12.39	13.34	14.31	16.30	17.32	19.38	25.83	32.59	

SPACING = 11.0 m (RADIUS = 7.8 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	4.02	4.03	4.27	4.43	4.59	4.75	5.09	5.26	5.61	6.67	7.75
	10	4.86	4.91	5.26	5.46	5.68	5.90	6.36	6.60	7.07	8.56	10.14
	20	6.01	6.14	6.67	6.97	7.29	7.62	8.30	8.65	9.38	11.69	14.17
	30	6.87	7.09	7.79	8.19	8.61	9.04	9.94	10.41	11.37	14.46	17.76
	40	7.60	7.90	8.77	9.27	9.78	10.32	11.44	12.02	13.21	17.02	21.09
	60	8.83	9.30	10.53	11.21	11.93	12.66	14.20	14.99	16.62	21.76	27.21
	70	9.38	9.93	11.34	12.12	12.93	13.76	15.50	16.39	18.22	23.99	30.08
	80	9.89	10.53	12.12	12.99	13.90	14.83	16.75	17.75	19.77	26.14	32.86
200	5	4.30	4.32	4.57	4.72	4.89	5.06	5.41	5.58	5.94	7.02	8.11
	10	5.23	5.28	5.63	5.84	6.06	6.29	6.75	6.99	7.47	8.96	10.52
	20	6.47	6.60	7.13	7.43	7.75	8.08	8.76	9.11	9.82	12.10	14.54
	30	7.41	7.61	8.30	8.70	9.11	9.53	10.42	10.88	11.82	14.84	18.10
	40	8.19	8.47	9.32	9.81	10.31	10.83	11.92	12.49	13.65	17.39	21.40
	60	9.51	9.94	11.12	11.78	12.47	13.18	14.67	15.44	17.03	22.10	27.50
	70	10.08	10.59	11.94	12.69	13.47	14.27	15.96	16.83	18.62	24.31	30.36
	80	10.62	11.21	12.73	13.56	14.43	15.33	17.20	18.17	20.16	26.45	33.13
250	5	4.55	4.56	4.82	4.98	5.15	5.32	5.68	5.86	6.23	7.33	8.43
	10	5.54	5.59	5.95	6.16	6.39	6.62	7.09	7.33	7.82	9.33	10.88
	20	6.88	7.00	7.53	7.83	8.15	8.48	9.17	9.52	10.23	12.48	14.89
	30	7.87	8.06	8.75	9.15	9.56	9.98	10.86	11.31	12.24	15.22	18.43
	40	8.70	8.97	9.81	10.29	10.79	11.30	12.37	12.93	14.07	17.75	21.71
	60	10.09	10.50	11.65	12.30	12.97	13.66	15.12	15.87	17.43	22.43	27.78
	70	10.70	11.18	12.49	13.21	13.97	14.76	16.40	17.25	19.01	24.63	30.63
	80	11.26	11.82	13.28	14.09	14.94	15.81	17.64	18.59	20.54	26.76	33.39
300	5	4.76	4.77	5.04	5.20	5.38	5.56	5.92	6.11	6.48	7.60	8.72
	10	5.82	5.86	6.23	6.45	6.68	6.91	7.40	7.64	8.14	9.66	11.22
	20	7.23	7.35	7.88	8.19	8.52	8.85	9.54	9.89	10.60	12.85	15.23
	30	8.28	8.47	9.16	9.55	9.96	10.39	11.26	11.71	12.64	15.58	18.76
	40	9.16	9.41	10.25	10.73	11.22	11.73	12.80	13.34	14.48	18.10	22.02
	60	10.61	11.00	12.14	12.77	13.44	14.12	15.55	16.29	17.83	22.76	28.06
	70	11.24	11.70	12.99	13.70	14.45	15.22	16.83	17.67	19.40	24.95	30.91
	80	11.84	12.36	13.80	14.59	15.42	16.28	18.07	19.00	20.92	27.07	33.66
400	5	5.13	5.14	5.42	5.59	5.78	5.96	6.35	6.54	6.93	8.08	9.24
	10	6.29	6.34	6.72	6.95	7.18	7.43	7.93	8.18	8.69	10.25	11.82
	20	7.85	7.96	8.50	8.82	9.15	9.49	10.19	10.55	11.27	13.52	15.88
	30	8.99	9.17	9.87	10.26	10.68	11.11	11.99	12.44	13.36	16.27	19.39
	40	9.94	10.18	11.02	11.50	12.00	12.51	13.56	14.11	15.22	18.79	22.63
	60	11.52	11.88	13.00	13.63	14.28	14.96	16.36	17.09	18.58	23.40	28.63
	70	12.20	12.63	13.89	14.59	15.32	16.07	17.65	18.46	20.15	25.58	31.45
	80	12.83	13.33	14.72	15.50	16.30	17.14	18.88	19.79	21.66	27.69	34.18

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.0 m (RADIUS = 7.8 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TEMPERATURE
 TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
0	5	3.08	3.37	4.01	4.34	4.67	5.00	5.67	6.01	6.68	8.74	10.86
	10	3.94	4.46	5.48	5.99	6.49	6.99	8.00	8.51	9.53	12.65	15.87
	20	5.38	6.29	7.95	8.75	9.54	10.33	11.92	12.71	14.31	19.22	24.29
	30	6.64	7.90	10.12	11.18	12.22	13.27	15.35	16.40	18.51	24.98	31.68
	40	7.79	9.37	12.11	13.40	14.68	15.96	18.50	19.78	22.36	30.26	38.47
	60	9.91	12.07	15.75	17.48	19.19	20.89	24.28	25.98	29.41	39.95	50.89
	70	10.90	13.34	17.45	19.39	21.30	23.19	26.98	28.88	32.71	44.48	56.70
	80	11.86	14.56	19.09	21.23	23.33	25.42	29.59	31.68	35.89	48.84	62.30
10	5	3.63	3.78	4.30	4.60	4.90	5.22	5.86	6.18	6.84	8.87	10.96
	10	4.45	4.82	5.73	6.20	6.69	7.17	8.16	8.65	9.66	12.75	15.96
	20	5.82	6.60	8.16	8.94	9.71	10.49	12.05	12.84	14.42	19.31	24.37
	30	7.04	8.18	10.31	11.34	12.37	13.40	15.47	16.51	18.61	25.06	31.75
	40	8.17	9.63	12.28	13.56	14.82	16.09	18.62	19.89	22.45	30.34	38.53
	60	10.26	12.31	15.91	17.62	19.32	21.00	24.38	26.08	29.50	40.02	50.95
	70	11.24	13.56	17.60	19.52	21.42	23.30	27.08	28.97	32.79	44.54	56.76
	80	12.18	14.77	19.24	21.36	23.45	25.52	29.68	31.77	35.97	48.91	62.36
20	5	3.99	4.11	4.57	4.84	5.13	5.42	6.04	6.35	7.00	8.99	11.07
	10	4.86	5.15	5.97	6.42	6.88	7.35	8.31	8.80	9.79	12.86	16.05
	20	6.24	6.90	8.37	9.12	9.88	10.64	12.18	12.96	14.54	19.40	24.45
	30	7.44	8.45	10.49	11.51	12.52	13.54	15.59	16.62	18.71	25.14	31.82
	40	8.55	9.89	12.46	13.71	14.96	16.21	18.73	19.99	22.55	30.42	38.60
	60	10.60	12.54	16.07	17.76	19.44	21.12	24.48	26.17	29.58	40.09	51.01
	70	11.56	13.79	17.76	19.66	21.54	23.42	27.17	29.06	32.87	44.61	56.81
	80	12.50	14.99	19.39	21.49	23.56	25.63	29.77	31.85	36.05	48.97	62.41
50	5	4.69	4.77	5.19	5.44	5.70	5.98	6.55	6.84	7.45	9.36	11.39
	10	5.71	5.92	6.62	7.02	7.43	7.87	8.77	9.23	10.18	13.18	16.32
	20	7.22	7.71	8.97	9.65	10.36	11.09	12.57	13.33	14.87	19.66	24.67
	30	8.46	9.23	11.05	12.00	12.97	13.95	15.94	16.96	19.01	25.38	32.03
	40	9.56	10.64	12.98	14.17	15.38	16.60	19.06	20.31	22.83	30.64	38.79
	60	11.58	13.23	16.54	18.18	19.82	21.47	24.78	26.46	29.84	40.29	51.18
	70	12.52	14.45	18.21	20.06	21.90	23.75	27.46	29.34	33.12	44.80	56.98
	80	13.43	15.64	19.83	21.88	23.91	25.95	30.05	32.12	36.29	49.16	62.57
100	5	5.43	5.49	5.90	6.15	6.41	6.68	7.24	7.52	8.11	9.95	11.91
	10	6.64	6.81	7.46	7.83	8.22	8.63	9.48	9.91	10.82	13.69	16.76
	20	8.36	8.75	9.86	10.49	11.14	11.81	13.21	13.93	15.42	20.10	25.05
	30	9.72	10.33	11.92	12.79	13.69	14.62	16.53	17.51	19.51	25.78	32.37
	40	10.90	11.75	13.81	14.92	16.06	17.22	19.61	20.82	23.30	31.01	39.11
	60	12.97	14.32	17.31	18.86	20.44	22.04	25.28	26.93	30.26	40.63	51.47
	70	13.93	15.52	18.96	20.72	22.50	24.30	27.94	29.79	33.53	45.13	57.26
	80	14.84	16.68	20.55	22.52	24.50	26.49	30.52	32.56	36.68	49.48	62.84

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.0 m (RADIUS = 7.8 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	1	2	4	5	6	7	9	10	12	18	24
150	5.96 7.32 9.22 10.68 11.94 14.12 15.10 16.04	6.02 7.48 9.57 11.23 12.69 15.30 16.50 17.65	6.44 8.11 10.62 12.71 14.60 18.06 19.69 21.27	6.69 8.48 11.21 13.53 15.64 19.54 21.37 23.15	6.95 8.87 11.83 14.38 16.72 21.05 23.09 25.07	7.23 9.26 12.48 15.26 17.84 22.60 24.84 27.02	7.79 10.09 13.82 17.10 20.15 25.77 28.42 30.98	8.08 10.52 14.52 18.06 21.33 27.39 30.24 32.99	8.66 11.40 15.96 20.01 23.76 30.69 33.94 37.08	10.48 14.20 20.54 26.18 31.39 40.97 45.45 49.79	12.40 17.20 25.43 32.71 39.42 51.76 57.53 63.11
200	6.40 7.88 9.92 11.49 12.82 15.09 16.11 17.08	6.45 8.02 10.25 11.99 13.51 16.17 17.39 18.55	6.88 8.66 11.27 13.41 15.32 18.78 20.40 21.96	7.13 9.03 11.85 14.20 16.32 20.19 22.01 23.78	7.40 9.41 12.46 15.02 17.36 21.66 23.68 25.64	7.68 9.81 13.09 15.88 18.44 23.16 25.39 27.54	8.25 10.64 14.40 17.66 20.68 26.26 28.89 31.44	8.54 11.06 15.08 18.59 21.84 27.86 30.69 33.42	9.13 11.93 16.48 20.50 24.22 31.11 34.34 37.47	10.96 14.68 20.98 26.57 31.76 41.30 45.78 50.10	12.86 17.63 25.80 33.05 39.74 52.04 57.81 63.38
250	6.77 8.36 10.53 12.18 13.58 15.95 17.01 18.00	6.82 8.50 10.84 12.66 14.23 16.96 18.19 19.38	7.25 9.13 11.85 14.04 15.98 19.46 21.08 22.64	7.52 9.51 12.43 14.81 16.95 20.83 22.64 24.39	7.79 9.89 13.03 15.62 17.96 22.25 24.26 26.20	8.08 10.30 13.65 16.46 19.01 23.71 25.92 28.06	8.66 11.12 14.94 18.20 21.20 26.75 29.36 31.89	8.95 11.55 15.61 19.11 22.34 28.32 31.13 33.86	9.55 12.41 16.98 20.98 24.68 31.52 34.74 37.86	11.39 15.14 21.40 26.97 32.13 41.64 46.10 50.42	13.29 18.05 26.17 33.38 40.05 52.33 58.08 63.64
300	7.10 8.78 11.07 12.80 14.26 16.72 17.81 18.83	7.15 8.91 11.37 13.26 14.88 17.68 18.94 20.14	7.59 9.56 12.37 14.62 16.59 20.10 21.72 23.28	7.86 9.93 12.95 15.38 17.54 21.43 23.24 24.99	8.14 10.33 13.54 16.18 18.53 22.82 24.82 26.76	8.43 10.73 14.16 17.00 19.56 24.25 26.45 28.58	9.02 11.56 15.44 18.72 21.71 27.23 29.83 32.35	9.32 11.99 16.10 19.61 22.83 28.77 31.57 34.29	9.93 12.86 17.46 21.45 25.13 31.94 35.15 38.25	11.78 15.58 21.82 27.36 32.49 41.97 46.42 50.73	13.69 18.46 26.54 33.72 40.37 52.62 58.36 63.91
400	7.67 9.51 12.00 13.88 15.44 18.07 19.22 20.31	7.72 9.64 12.29 14.31 16.02 18.96 20.27 21.51	8.17 10.30 13.29 15.65 17.69 21.28 22.92 24.49	8.45 10.68 13.87 16.40 18.62 22.56 24.38 26.13	8.74 11.08 14.46 17.18 19.59 23.90 25.90 27.83	9.04 11.50 15.08 17.99 20.59 25.28 27.47 29.58	9.65 12.34 16.35 19.68 22.68 28.17 30.75 33.25	9.96 12.77 17.01 20.55 23.77 29.67 32.45 35.14	10.59 13.65 18.35 22.35 26.01 32.76 35.94 39.03	12.48 16.38 22.64 28.13 33.22 42.64 47.07 51.35	14.41 19.24 27.26 34.39 41.00 53.19 58.91 64.44

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.5 m (RADIUS = 8.1 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	5	0.99	1.01	1.11	1.17	1.24	1.31	1.44	1.51	1.64	2.06	2.48	
	10	1.10	1.15	1.30	1.39	1.47	1.56	1.74	1.83	2.01	2.56	3.11	
	20	1.29	1.39	1.62	1.74	1.87	1.99	2.24	2.37	2.62	3.39	4.18	
	30	1.45	1.60	1.90	2.06	2.21	2.37	2.68	2.84	3.16	4.13	5.12	
	40	1.61	1.79	2.16	2.34	2.53	2.72	3.09	3.27	3.65	4.80	5.98	
	60	1.88	2.14	2.63	2.87	3.11	3.35	3.83	4.07	4.55	6.03	7.56	
	70	2.01	2.30	2.85	3.12	3.38	3.65	4.18	4.44	4.98	6.61	8.30	
	80	2.13	2.46	3.06	3.35	3.64	3.93	4.51	4.80	5.38	7.17	9.01	
10	5	1.26	1.25	1.32	1.37	1.43	1.49	1.61	1.67	1.79	2.18	2.58	
	10	1.41	1.41	1.51	1.58	1.66	1.73	1.89	1.97	2.14	2.66	3.20	
	20	1.62	1.65	1.82	1.92	2.03	2.14	2.37	2.49	2.73	3.48	4.26	
	30	1.79	1.85	2.09	2.22	2.36	2.51	2.80	2.95	3.26	4.21	5.19	
	40	1.94	2.04	2.33	2.50	2.67	2.84	3.20	3.38	3.75	4.88	6.05	
	60	2.20	2.37	2.79	3.01	3.24	3.47	3.93	4.16	4.64	6.10	7.62	
	70	2.33	2.53	3.00	3.25	3.50	3.76	4.27	4.53	5.06	6.68	8.36	
	80	2.45	2.68	3.21	3.49	3.76	4.04	4.60	4.89	5.46	7.23	9.06	
20	5	1.37	1.36	1.43	1.49	1.54	1.60	1.72	1.78	1.91	2.29	2.68	
	10	1.55	1.55	1.65	1.72	1.79	1.87	2.02	2.10	2.26	2.77	3.29	
	20	1.80	1.82	1.98	2.07	2.17	2.28	2.50	2.61	2.84	3.57	4.34	
	30	1.99	2.04	2.25	2.37	2.50	2.64	2.92	3.06	3.36	4.29	5.26	
	40	2.16	2.23	2.49	2.65	2.80	2.97	3.31	3.48	3.84	4.95	6.11	
	60	2.44	2.57	2.94	3.15	3.36	3.58	4.03	4.26	4.73	6.17	7.68	
	70	2.57	2.73	3.15	3.39	3.62	3.87	4.37	4.62	5.14	6.74	8.41	
	80	2.70	2.88	3.36	3.61	3.88	4.15	4.70	4.98	5.54	7.30	9.12	
50	5	1.58	1.57	1.64	1.70	1.76	1.82	1.95	2.01	2.14	2.53	2.93	
	10	1.82	1.81	1.92	1.99	2.06	2.14	2.29	2.37	2.53	3.03	3.54	
	20	2.14	2.16	2.30	2.40	2.49	2.60	2.81	2.91	3.13	3.83	4.56	
	30	2.38	2.42	2.61	2.72	2.84	2.97	3.23	3.37	3.65	4.53	5.46	
	40	2.59	2.64	2.87	3.01	3.15	3.30	3.62	3.78	4.11	5.18	6.30	
	60	2.93	3.02	3.33	3.52	3.71	3.91	4.32	4.54	4.98	6.38	7.85	
	70	3.08	3.19	3.55	3.75	3.97	4.19	4.65	4.89	5.39	6.94	8.58	
	80	3.22	3.35	3.75	3.98	4.21	4.46	4.97	5.24	5.78	7.49	9.28	
100	5	1.79	1.78	1.86	1.92	1.99	2.05	2.19	2.26	2.39	2.81	3.21	
	10	2.09	2.09	2.20	2.27	2.35	2.43	2.59	2.68	2.84	3.36	3.87	
	20	2.50	2.50	2.66	2.75	2.85	2.96	3.17	3.28	3.50	4.19	4.90	
	30	2.79	2.82	3.01	3.12	3.25	3.37	3.63	3.77	4.04	4.89	5.79	
	40	3.04	3.08	3.31	3.44	3.58	3.73	4.04	4.19	4.51	5.53	6.62	
	60	3.44	3.52	3.82	3.99	4.17	4.36	4.75	4.96	5.37	6.71	8.14	
	70	3.62	3.71	4.04	4.24	4.44	4.65	5.08	5.31	5.77	7.26	8.86	
	80	3.78	3.89	4.26	4.47	4.69	4.92	5.40	5.65	6.16	7.80	9.55	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.5 m (RADIUS = 8.1 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150	5	1.95	1.93	2.02	2.08	2.15	2.22	2.36	2.43	2.58	3.01	3.43	
	10	2.29	2.29	2.40	2.48	2.56	2.64	2.82	2.81	3.08	3.60	4.13	
	20	2.75	2.76	2.92	3.02	3.12	3.23	3.45	3.56	3.79	4.48	5.20	
	30	3.09	3.11	3.30	3.42	3.55	3.68	3.94	4.08	4.35	5.21	6.10	
	40	3.37	3.40	3.63	3.77	3.91	4.06	4.37	4.53	4.85	5.85	6.91	
	60	3.82	3.89	4.18	4.36	4.54	4.73	5.11	5.31	5.72	7.02	8.42	
	70	4.02	4.10	4.43	4.62	4.82	5.02	5.45	5.67	6.13	7.57	9.13	
	80	4.20	4.30	4.66	4.87	5.08	5.31	5.78	6.02	6.51	8.10	9.81	
200	5	2.07	2.06	2.15	2.22	2.28	2.36	2.50	2.58	2.73	3.17	3.61	
	10	2.45	2.45	2.57	2.65	2.73	2.82	3.00	3.09	3.27	3.81	4.35	
	20	2.96	2.97	3.13	3.23	3.34	3.45	3.68	3.79	4.03	4.74	5.46	
	30	3.33	3.35	3.55	3.67	3.80	3.93	4.20	4.34	4.62	5.48	6.37	
	40	3.63	3.67	3.90	4.04	4.19	4.34	4.65	4.81	5.13	6.14	7.19	
	60	4.13	4.19	4.49	4.66	4.85	5.04	5.43	5.63	6.03	7.32	8.69	
	70	4.34	4.42	4.75	4.94	5.14	5.35	5.77	5.99	6.44	7.87	9.39	
	80	4.54	4.63	4.99	5.20	5.42	5.64	6.10	6.34	6.83	8.39	10.07	
250	5	2.18	2.16	2.26	2.33	2.40	2.47	2.63	2.70	2.86	3.31	3.76	
	10	2.59	2.58	2.71	2.79	2.88	2.97	3.15	3.24	3.43	3.99	4.54	
	20	3.14	3.14	3.31	3.41	3.53	3.64	3.87	3.99	4.23	4.96	5.69	
	30	3.53	3.55	3.76	3.88	4.01	4.15	4.43	4.57	4.85	5.73	6.62	
	40	3.86	3.89	4.13	4.27	4.42	4.58	4.90	5.06	5.39	6.40	7.45	
	60	4.39	4.45	4.75	4.93	5.12	5.31	5.70	5.90	6.31	7.59	8.95	
	70	4.62	4.70	5.03	5.22	5.42	5.63	6.06	6.28	6.73	8.14	9.65	
	80	4.84	4.92	5.28	5.49	5.71	5.93	6.40	6.64	7.13	8.67	10.33	
300	5	2.27	2.26	2.36	2.43	2.50	2.58	2.73	2.81	2.97	3.44	3.90	
	10	2.71	2.70	2.83	2.92	3.01	3.10	3.29	3.38	3.58	4.15	4.71	
	20	3.29	3.30	3.47	3.58	3.69	3.81	4.05	4.17	4.42	5.16	5.90	
	30	3.72	3.73	3.94	4.07	4.21	4.34	4.63	4.77	5.06	5.95	6.85	
	40	4.06	4.09	4.34	4.48	4.64	4.79	5.12	5.28	5.61	6.64	7.69	
	60	4.63	4.69	4.99	5.17	5.36	5.55	5.95	6.15	6.56	7.85	9.20	
	70	4.87	4.94	5.27	5.47	5.67	5.88	6.32	6.54	6.99	8.40	9.90	
	80	5.10	5.18	5.54	5.75	5.97	6.20	6.67	6.91	7.39	8.93	10.57	
400	5	2.43	2.42	2.52	2.60	2.67	2.75	2.92	3.00	3.17	3.66	4.13	
	10	2.92	2.91	3.05	3.14	3.23	3.33	3.53	3.63	3.83	4.43	5.01	
	20	3.56	3.57	3.75	3.86	3.98	4.10	4.36	4.48	4.74	5.50	6.27	
	30	4.03	4.05	4.26	4.40	4.54	4.68	4.98	5.13	5.43	6.34	7.26	
	40	4.41	4.44	4.69	4.84	5.00	5.17	5.50	5.67	6.01	7.06	8.12	
	60	5.03	5.09	5.40	5.58	5.78	5.98	6.38	6.59	7.01	8.31	9.66	
	70	5.30	5.36	5.71	5.91	6.12	6.33	6.77	7.00	7.46	8.88	10.36	
	80	5.54	5.62	5.99	6.21	6.43	6.66	7.14	7.38	7.88	9.42	11.04	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.5 m (RADIUS = 8.1 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	5	1.42	1.47	1.66	1.76	1.87	1.98	2.20	2.31	2.53	3.21	3.90	
	10	1.64	1.75	2.04	2.19	2.34	2.49	2.80	2.95	3.26	4.21	5.18	
	20	2.02	2.23	2.68	2.90	3.13	3.35	3.80	4.03	4.49	5.88	7.32	
	30	2.35	2.65	3.24	3.53	3.82	4.10	4.68	4.97	5.56	7.35	9.19	
	40	2.65	3.03	3.75	4.10	4.45	4.80	5.49	5.84	6.55	8.70	10.92	
	60	3.20	3.73	4.69	5.15	5.61	6.07	6.98	7.43	8.35	11.16	14.07	
	70	3.46	4.06	5.13	5.65	6.15	6.66	7.67	8.18	9.19	12.32	15.55	
	80	3.71	4.38	5.56	6.12	6.68	7.23	8.34	8.89	10.01	13.43	16.97	
10	5	1.78	1.78	1.91	2.00	2.09	2.18	2.38	2.48	2.69	3.34	4.01	
	10	2.03	2.07	2.27	2.40	2.53	2.67	2.95	3.10	3.40	4.32	5.27	
	20	2.41	2.53	2.88	3.08	3.29	3.50	3.94	4.15	4.60	5.97	7.39	
	30	2.73	2.92	3.43	3.69	3.97	4.24	4.80	5.09	5.66	7.43	9.26	
	40	3.02	3.29	3.93	4.26	4.59	4.93	5.61	5.95	6.64	8.77	10.98	
	60	3.54	3.97	4.85	5.30	5.74	6.18	7.08	7.53	8.44	11.23	14.13	
	70	3.79	4.29	5.29	5.78	6.28	6.77	7.77	8.27	9.28	12.38	15.60	
	80	4.03	4.60	5.71	6.25	6.80	7.34	8.43	8.98	10.09	13.49	17.02	
20	5	1.95	1.95	2.07	2.16	2.25	2.34	2.53	2.63	2.83	3.46	4.12	
	10	2.25	2.27	2.46	2.58	2.70	2.83	3.10	3.24	3.53	4.42	5.36	
	20	2.68	2.76	3.08	3.26	3.45	3.65	4.07	4.28	4.71	6.06	7.47	
	30	3.02	3.16	3.61	3.86	4.12	4.38	4.92	5.20	5.76	7.51	9.33	
	40	3.31	3.53	4.10	4.41	4.73	5.05	5.72	6.05	6.74	8.85	11.05	
	60	3.85	4.19	5.01	5.44	5.87	6.30	7.18	7.62	8.52	11.30	14.19	
	70	4.09	4.51	5.44	5.92	6.40	6.88	7.86	8.36	9.36	12.45	15.66	
	80	4.33	4.81	5.86	6.38	6.92	7.45	8.53	9.07	10.17	13.56	17.08	
50	5	2.27	2.26	2.39	2.47	2.57	2.66	2.86	2.96	3.16	3.78	4.41	
	10	2.65	2.67	2.85	2.96	3.08	3.21	3.47	3.60	3.87	4.72	5.62	
	20	3.18	3.24	3.52	3.69	3.87	4.05	4.43	4.63	5.04	6.33	7.70	
	30	3.59	3.69	4.07	4.29	4.53	4.77	5.27	5.53	6.06	7.75	9.54	
	40	3.93	4.08	4.57	4.84	5.13	5.43	6.05	6.36	7.02	9.08	11.24	
	60	4.52	4.78	5.46	5.84	6.24	6.64	7.48	7.91	8.78	11.51	14.36	
	70	4.79	5.09	5.88	6.31	6.76	7.22	8.15	8.63	9.61	12.65	15.83	
	80	5.04	5.39	6.29	6.77	7.26	7.77	8.81	9.34	10.41	13.75	17.24	
100	5	2.60	2.59	2.72	2.81	2.91	3.01	3.21	3.32	3.53	4.16	4.80	
	10	3.08	3.08	3.27	3.39	3.51	3.64	3.90	4.04	4.31	5.15	6.03	
	20	3.72	3.77	4.04	4.21	4.38	4.56	4.93	5.12	5.51	6.75	8.07	
	30	4.20	4.29	4.65	4.86	5.08	5.31	5.78	6.03	6.53	8.15	9.88	
	40	4.61	4.73	5.17	5.43	5.70	5.97	6.55	6.85	7.47	9.45	11.56	
	60	5.29	5.49	6.10	6.45	6.81	7.18	7.96	8.37	9.20	11.85	14.65	
	70	5.59	5.83	6.53	6.92	7.32	7.74	8.62	9.08	10.01	12.97	16.11	
	80	5.87	6.15	6.93	7.37	7.82	8.29	9.27	9.77	10.80	14.07	17.51	

SPACING = 11.5 m (RADIUS = 8.1 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

CEILING HEIGHT, m

RESPONSE TEMPERATURE
 TIME INDEX RISE

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	2.83	2.82	2.96	3.06	3.16	3.26	3.48	3.59	3.80	4.46	5.12
	10	3.38	3.38	3.58	3.70	3.83	3.96	4.23	4.37	4.65	5.51	6.38
	20	4.11	4.15	4.43	4.60	4.77	4.95	5.33	5.52	5.91	7.13	8.42
	30	4.65	4.73	5.08	5.29	5.51	5.74	6.21	6.45	6.95	8.53	10.21
	40	5.11	5.22	5.65	5.90	6.16	6.43	7.00	7.29	7.89	9.81	11.87
	60	5.86	6.04	6.62	6.95	7.30	7.66	8.41	8.80	9.61	12.18	14.94
	70	6.19	6.40	7.06	7.43	7.82	8.23	9.07	9.51	10.41	13.30	16.38
	80	6.49	6.74	7.48	7.89	8.32	8.77	9.71	10.19	11.19	14.38	17.78
200	5	3.03	3.01	3.16	3.26	3.36	3.47	3.69	3.80	4.03	4.71	5.38
	10	3.63	3.63	3.83	3.95	4.09	4.22	4.50	4.65	4.93	5.81	6.69
	20	4.43	4.46	4.75	4.92	5.10	5.28	5.66	5.86	6.25	7.47	8.75
	30	5.02	5.09	5.45	5.66	5.88	6.11	6.58	6.82	7.32	8.88	10.54
	40	5.51	5.61	6.04	6.30	6.56	6.83	7.39	7.68	8.27	10.16	12.18
	60	6.32	6.49	7.06	7.39	7.73	8.09	8.82	9.20	9.99	12.51	15.23
	70	6.68	6.88	7.52	7.89	8.27	8.66	9.48	9.91	10.79	13.62	16.66
	80	7.01	7.24	7.95	8.35	8.77	9.21	10.12	10.59	11.57	14.69	18.05
250	5	3.19	3.18	3.33	3.43	3.54	3.65	3.88	3.99	4.23	4.92	5.60
	10	3.84	3.84	4.04	4.17	4.31	4.45	4.74	4.88	5.18	6.07	6.97
	20	4.70	4.73	5.02	5.20	5.38	5.57	5.95	6.15	6.55	7.78	9.06
	30	5.33	5.40	5.76	5.98	6.20	6.43	6.91	7.15	7.65	9.20	10.85
	40	5.86	5.96	6.39	6.64	6.91	7.18	7.74	8.03	8.62	10.49	12.48
	60	6.73	6.88	7.45	7.78	8.12	8.47	9.20	9.58	10.35	12.83	15.51
	70	7.10	7.29	7.93	8.29	8.66	9.06	9.87	10.29	11.15	13.93	16.93
	80	7.45	7.67	8.37	8.77	9.18	9.61	10.51	10.97	11.93	15.00	18.31
300	5	3.33	3.32	3.48	3.58	3.69	3.81	4.04	4.16	4.40	5.11	5.81
	10	4.02	4.03	4.23	4.37	4.51	4.65	4.95	5.10	5.40	6.30	7.21
	20	4.94	4.97	5.26	5.44	5.63	5.82	6.22	6.42	6.82	8.06	9.35
	30	5.61	5.68	6.04	6.26	6.49	6.72	7.20	7.45	7.95	9.51	11.14
	40	6.17	6.26	6.70	6.95	7.22	7.49	8.06	8.35	8.94	10.80	12.78
	60	7.08	7.23	7.80	8.13	8.47	8.82	9.55	9.92	10.69	13.14	15.79
	70	7.48	7.66	8.29	8.65	9.03	9.42	10.22	10.64	11.50	14.24	17.20
	80	7.84	8.05	8.75	9.14	9.56	9.98	10.87	11.33	12.27	15.30	18.58
400	5	3.58	3.57	3.73	3.84	3.96	4.08	4.33	4.45	4.70	5.44	6.16
	10	4.34	4.35	4.56	4.70	4.85	5.00	5.31	5.47	5.78	6.72	7.65
	20	5.35	5.39	5.69	5.87	6.07	6.27	6.67	6.88	7.30	8.57	9.86
	30	6.09	6.15	6.53	6.75	6.99	7.23	7.72	7.97	8.48	10.06	11.69
	40	6.70	6.79	7.23	7.49	7.77	8.05	8.62	8.91	9.51	11.37	13.33
	60	7.70	7.84	8.41	8.74	9.09	9.44	10.17	10.54	11.31	13.73	16.33
	70	8.13	8.30	8.93	9.29	9.67	10.06	10.87	11.28	12.13	14.83	17.74
	80	8.52	8.72	9.41	9.81	10.22	10.65	11.53	11.98	12.91	15.88	19.10

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.5 m (RADIUS = 8.1 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	5	2.10	2.22	2.57	2.75	2.93	3.12	3.50	3.69	4.07	5.23	6.42	
	10	2.54	2.79	3.33	3.60	3.87	4.14	4.69	4.97	5.53	7.22	8.97	
	20	3.29	3.74	4.60	5.03	5.45	5.87	6.70	7.13	7.98	10.57	13.25	
	30	3.95	4.58	5.72	6.28	6.83	7.37	8.47	9.02	10.12	13.51	17.00	
	40	4.55	5.34	6.75	7.43	8.10	8.76	10.09	10.75	12.09	16.20	20.45	
	60	5.65	6.75	8.64	9.53	10.42	11.30	13.05	13.93	15.70	21.13	26.76	
	70	6.17	7.40	9.52	10.52	11.50	12.48	14.44	15.42	17.39	23.44	29.71	
	80	6.67	8.04	10.37	11.47	12.55	13.63	15.78	16.85	19.02	25.67	32.55	
10	5	2.56	2.60	2.85	3.00	3.17	3.33	3.68	3.86	4.23	5.36	6.53	
	10	3.01	3.14	3.57	3.82	4.07	4.33	4.85	5.12	5.66	7.33	9.06	
	20	3.73	4.05	4.81	5.21	5.61	6.02	6.84	7.25	8.09	10.66	13.32	
	30	4.35	4.86	5.92	6.45	6.98	7.51	8.59	9.13	10.22	13.59	17.07	
	40	4.93	5.60	6.93	7.58	8.24	8.89	10.20	10.86	12.19	16.28	20.51	
	60	6.00	6.98	8.80	9.68	10.55	11.41	13.15	14.03	15.79	21.20	26.82	
	70	6.51	7.63	9.67	10.65	11.63	12.60	14.54	15.51	17.48	23.51	29.76	
	80	6.99	8.26	10.52	11.60	12.67	13.74	15.87	16.94	19.10	25.73	32.61	
20	5	2.82	2.84	3.07	3.22	3.37	3.53	3.86	4.03	4.38	5.49	6.64	
	10	3.32	3.42	3.80	4.02	4.26	4.50	5.01	5.27	5.79	7.44	9.15	
	20	4.08	4.33	5.02	5.39	5.78	6.17	6.97	7.38	8.20	10.75	13.40	
	30	4.72	5.13	6.10	6.61	7.13	7.65	8.71	9.24	10.33	13.67	17.14	
	40	5.29	5.86	7.11	7.74	8.38	9.02	10.31	10.97	12.29	16.35	20.58	
	60	6.34	7.22	8.96	9.82	10.67	11.53	13.26	14.12	15.88	21.27	26.87	
	70	6.83	7.86	9.83	10.79	11.75	12.71	14.63	15.60	17.56	23.57	29.82	
	80	7.31	8.47	10.67	11.73	12.79	13.85	15.97	17.03	19.18	25.79	32.66	
50	5	3.30	3.31	3.53	3.67	3.82	3.97	4.30	4.46	4.80	5.85	6.95	
	10	3.93	3.99	4.33	4.54	4.75	4.98	5.44	5.68	6.18	7.75	9.42	
	20	4.82	5.00	5.58	5.91	6.25	6.61	7.36	7.75	8.54	11.02	13.63	
	30	5.52	5.82	6.64	7.10	7.57	8.06	9.07	9.58	10.63	13.91	17.35	
	40	6.13	6.55	7.62	8.20	8.79	9.40	10.65	11.28	12.57	16.58	20.77	
	60	7.21	7.89	9.43	10.24	11.05	11.88	13.56	14.41	16.14	21.48	27.05	
	70	7.71	8.51	10.28	11.19	12.12	13.04	14.93	15.88	17.81	23.77	29.99	
	80	8.18	9.11	11.11	12.12	13.14	14.17	16.25	17.30	19.42	25.99	32.83	
100	5	3.80	3.80	4.03	4.17	4.33	4.49	4.81	4.98	5.32	6.36	7.44	
	10	4.57	4.62	4.95	5.15	5.36	5.58	6.03	6.27	6.75	8.26	9.86	
	20	5.62	5.76	6.30	6.60	6.93	7.26	7.97	8.33	9.08	11.46	14.01	
	30	6.43	6.67	7.40	7.81	8.25	8.70	9.64	10.13	11.13	14.32	17.69	
	40	7.12	7.45	8.39	8.91	9.45	10.02	11.19	11.80	13.04	16.96	21.09	
	60	8.30	8.83	10.18	10.91	11.67	12.45	14.06	14.88	16.56	21.82	27.34	
	70	8.83	9.46	11.01	11.85	12.71	13.60	15.41	16.33	18.22	24.10	30.27	
	80	9.33	10.07	11.82	12.76	13.72	14.71	16.72	17.74	19.82	26.31	33.10	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.5 m (RADIUS = 8.1 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

CEILING HEIGHT, m

RESPONSE TEMPERATURE
TIME INDEX RISE

(m*s)^{1/2}

	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	4.16	4.16	4.40	4.55	4.70	4.87	5.20	5.38	5.72	6.78	7.86
	10	5.03	5.07	5.41	5.61	5.83	6.05	6.51	6.74	7.22	8.71	10.28
	20	6.21	6.34	6.86	7.16	7.48	7.81	8.49	8.85	9.57	11.89	14.38
	30	7.11	7.32	8.02	8.42	8.84	9.27	10.18	10.65	11.61	14.71	18.03
	40	7.86	8.16	9.04	9.53	10.05	10.59	11.71	12.30	13.50	17.33	21.41
	60	9.14	9.60	10.85	11.54	12.26	13.00	14.55	15.35	16.99	22.16	27.63
	70	9.70	10.26	11.69	12.47	13.29	14.14	15.88	16.78	18.63	24.43	30.55
	80	10.24	10.88	12.50	13.38	14.29	15.23	17.18	18.18	20.22	26.62	33.37
200	5	4.45	4.45	4.70	4.85	5.01	5.18	5.53	5.70	6.06	7.13	8.22
	10	5.41	5.45	5.79	6.00	6.22	6.44	6.91	7.14	7.62	9.12	10.67
	20	6.70	6.81	7.33	7.63	7.95	8.28	8.96	9.31	10.03	12.31	14.75
	30	7.66	7.86	8.54	8.94	9.35	9.78	10.67	11.12	12.07	15.11	18.37
	40	8.47	8.74	9.60	10.08	10.59	11.11	12.21	12.77	13.95	17.70	21.73
	60	9.83	10.26	11.45	12.12	12.81	13.53	15.03	15.80	17.40	22.50	27.92
	70	10.43	10.94	12.30	13.05	13.84	14.65	16.35	17.23	19.03	24.75	30.83
	80	10.99	11.58	13.11	13.96	14.84	15.74	17.63	18.61	20.61	26.94	33.64
250	5	4.70	4.70	4.95	5.11	5.28	5.45	5.81	5.99	6.35	7.45	8.55
	10	5.73	5.77	6.11	6.33	6.55	6.78	7.25	7.49	7.98	9.48	11.04
	20	7.11	7.22	7.74	8.05	8.37	8.70	9.38	9.73	10.44	12.70	15.11
	30	8.14	8.32	9.01	9.40	9.81	10.23	11.11	11.57	12.50	15.49	18.71
	40	9.00	9.26	10.10	10.58	11.07	11.59	12.67	13.22	14.37	18.06	22.04
	60	10.44	10.84	12.00	12.65	13.32	14.02	15.49	16.25	17.81	22.83	28.21
	70	11.06	11.54	12.86	13.59	14.36	15.15	16.80	17.66	19.43	25.08	31.11
	80	11.65	12.20	13.68	14.50	15.35	16.24	18.08	19.03	21.00	27.25	33.91
300	5	4.93	4.93	5.18	5.34	5.51	5.69	6.06	6.24	6.61	7.73	8.84
	10	6.01	6.05	6.40	6.62	6.85	7.08	7.56	7.81	8.30	9.82	11.38
	20	7.48	7.58	8.11	8.42	8.74	9.07	9.75	10.11	10.82	13.07	15.46
	30	8.56	8.74	9.42	9.81	10.22	10.65	11.53	11.98	12.90	15.86	19.04
	40	9.47	9.71	10.55	11.02	11.52	12.03	13.10	13.65	14.78	18.42	22.36
	60	10.97	11.36	12.49	13.13	13.80	14.49	15.93	16.67	18.21	23.17	28.50
	70	11.63	12.08	13.37	14.09	14.84	15.62	17.24	18.08	19.82	25.40	31.38
	80	12.24	12.77	14.21	15.01	15.84	16.71	18.51	19.45	21.38	27.57	34.18
400	5	5.31	5.31	5.57	5.74	5.92	6.11	6.49	6.68	7.06	8.22	9.37
	10	6.51	6.54	6.91	7.13	7.37	7.61	8.11	8.36	8.87	10.42	12.00
	20	8.11	8.21	8.74	9.06	9.39	9.73	10.42	10.78	11.50	13.75	16.12
	30	9.30	9.46	10.15	10.54	10.96	11.39	12.27	12.72	13.64	16.56	19.69
	40	10.28	10.51	11.34	11.82	12.31	12.82	13.88	14.43	15.55	19.12	22.98
	60	11.90	12.26	13.38	14.01	14.66	15.34	16.75	17.48	18.98	23.82	29.07
	70	12.61	13.03	14.29	15.00	15.73	16.49	18.07	18.89	20.59	26.04	31.93
	80	13.27	13.76	15.15	15.93	16.75	17.59	19.34	20.25	22.13	28.19	34.71

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.5 m (RADIUS = 8.1 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
0	5	3.21	3.50	4.15	4.47	4.81	5.14	5.81	6.15	6.82	8.89	11.01	
	10	4.10	4.63	5.66	6.17	6.68	7.19	8.20	8.71	9.74	12.87	16.10	
	20	5.60	6.53	8.22	9.03	9.83	10.63	12.22	13.02	14.63	19.57	24.66	
	30	6.91	8.20	10.46	11.53	12.59	13.65	15.75	16.80	18.93	25.44	32.17	
	40	8.12	9.74	12.52	13.83	15.13	16.42	18.99	20.28	22.87	30.82	39.06	
	60	10.33	12.54	16.29	18.05	19.78	21.49	24.92	26.64	30.09	40.69	51.69	
	70	11.36	13.86	18.05	20.01	21.95	23.87	27.69	29.61	33.47	45.31	57.59	
	80	12.36	15.12	19.75	21.91	24.04	26.15	30.37	32.48	36.72	49.76	63.28	
10	5	3.77	3.92	4.44	4.73	5.04	5.36	6.00	6.32	6.98	9.02	11.12	
	10	4.62	5.00	5.91	6.39	6.88	7.37	8.36	8.86	9.87	12.98	16.20	
	20	6.05	6.85	8.43	9.22	10.00	10.78	12.36	13.15	14.75	19.66	24.74	
	30	7.33	8.49	10.65	11.70	12.75	13.79	15.87	16.92	19.03	25.52	32.24	
	40	8.50	10.00	12.70	13.99	15.27	16.55	19.10	20.38	22.97	30.90	39.13	
	60	10.68	12.78	16.45	18.19	19.90	21.61	25.02	26.73	30.18	40.76	51.74	
	70	11.70	14.09	18.20	20.15	22.07	23.98	27.79	29.70	33.55	45.37	57.64	
	80	12.68	15.34	19.90	22.05	24.16	26.26	30.46	32.57	36.80	49.82	63.33	
20	5	4.14	4.25	4.71	4.98	5.27	5.57	6.18	6.50	7.14	9.15	11.23	
	10	5.04	5.33	6.16	6.61	7.08	7.55	8.52	9.01	10.01	13.09	16.29	
	20	6.48	7.15	8.64	9.40	10.17	10.94	12.49	13.28	14.86	19.75	24.82	
	30	7.73	8.76	10.84	11.87	12.90	13.92	15.99	17.03	19.13	25.60	32.31	
	40	8.88	10.26	12.87	14.15	15.41	16.68	19.21	20.49	23.06	30.98	39.19	
	60	11.02	13.02	16.61	18.33	20.03	21.73	25.12	26.83	30.27	40.83	51.80	
	70	12.03	14.31	18.36	20.29	22.19	24.09	27.89	29.79	33.63	45.44	57.70	
	80	13.01	15.56	20.05	22.18	24.28	26.37	30.56	32.66	36.89	49.89	63.39	
50	5	4.86	4.93	5.34	5.59	5.85	6.13	6.70	7.00	7.60	9.52	11.55	
	10	5.92	6.12	6.82	7.22	7.64	8.08	8.98	9.45	10.40	13.41	16.56	
	20	7.48	7.97	9.25	9.94	10.66	11.39	12.89	13.65	15.20	20.02	25.05	
	30	8.77	9.56	11.40	12.37	13.35	14.34	16.35	17.37	19.44	25.84	32.52	
	40	9.92	11.02	13.40	14.61	15.83	17.06	19.55	20.81	23.35	31.21	39.39	
	60	12.02	13.72	17.09	18.75	20.41	22.08	25.43	27.12	30.52	41.04	51.98	
	70	13.00	14.99	18.82	20.69	22.56	24.43	28.18	30.07	33.88	45.64	57.87	
	80	13.95	16.22	20.49	22.57	24.64	26.70	30.84	32.92	37.13	50.08	63.55	
100	5	5.62	5.67	6.07	6.32	6.58	6.85	7.40	7.69	8.28	10.12	12.08	
	10	6.87	7.04	7.68	8.05	8.44	8.85	9.70	10.14	11.05	13.93	17.01	
	20	8.66	9.04	10.16	10.79	11.45	12.12	13.54	14.26	15.76	20.47	25.43	
	30	10.06	10.68	12.29	13.17	14.08	15.02	16.95	17.93	19.95	26.25	32.86	
	40	11.29	12.16	14.25	15.37	16.52	17.70	20.11	21.33	23.82	31.58	39.71	
	60	13.45	14.82	17.87	19.45	21.04	22.66	25.93	27.59	30.96	41.38	52.27	
	70	14.44	16.07	19.58	21.37	23.17	24.99	28.67	30.53	34.30	45.97	58.15	
	80	15.39	17.28	21.23	23.22	25.23	27.24	31.31	33.37	37.53	50.40	63.82	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.5 m (RADIUS = 8.1 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	°C	CEILING HEIGHT, m										
			1	2	4	5	6	7	9	10	12	18	24
150	(m*s) ^{1/2}	5	6.17	6.22	6.62	6.87	7.13	7.41	7.97	8.25	8.84	10.66	12.58
		10	7.58	7.72	8.35	8.71	9.10	9.50	10.33	10.76	11.64	14.45	17.46
		20	9.54	9.88	10.94	11.53	12.16	12.81	14.16	14.86	16.31	20.91	25.81
		30	11.06	11.60	13.09	13.92	14.78	15.67	17.53	18.49	20.45	26.65	33.21
		40	12.36	13.12	15.05	16.10	17.20	18.33	20.65	21.85	24.29	31.96	40.03
		60	14.62	15.82	18.63	20.13	21.67	23.23	26.43	28.06	31.38	41.72	52.56
		70	15.64	17.07	20.32	22.03	23.77	25.54	29.15	30.98	34.71	46.30	58.43
		80	16.62	18.27	21.95	23.87	25.81	27.78	31.78	33.81	37.93	50.72	64.09
200		5	6.62	6.66	7.07	7.33	7.59	7.87	8.44	8.73	9.32	11.14	13.04
		10	8.15	8.28	8.91	9.28	9.66	10.06	10.88	11.31	12.18	14.94	17.89
		20	10.26	10.58	11.60	12.19	12.80	13.43	14.74	15.43	16.84	21.35	26.19
		30	11.88	12.38	13.81	14.61	15.44	16.30	18.10	19.03	20.95	27.06	33.55
		40	13.26	13.95	15.78	16.79	17.85	18.93	21.20	22.36	24.76	32.34	40.35
		60	15.62	16.72	19.37	20.80	22.28	23.80	26.93	28.53	31.81	42.06	52.85
		70	16.68	17.98	21.04	22.68	24.37	26.09	29.63	31.44	35.12	46.63	58.71
		80	17.68	19.19	22.66	24.50	26.39	28.31	32.24	34.25	38.33	51.04	64.37
250		5	7.00	7.04	7.46	7.72	7.99	8.27	8.85	9.15	9.74	11.58	13.48
		10	8.64	8.77	9.40	9.76	10.15	10.55	11.38	11.80	12.67	15.40	18.32
		20	10.89	11.19	12.20	12.77	13.37	14.00	15.29	15.96	17.35	21.78	26.57
		30	12.60	13.07	14.46	15.23	16.05	16.89	18.64	19.55	21.44	27.46	33.90
		40	14.04	14.69	16.46	17.44	18.46	19.52	21.73	22.87	25.22	32.71	40.67
		60	16.51	17.52	20.06	21.44	22.88	24.36	27.42	29.00	32.23	42.40	53.14
		70	17.60	18.81	21.73	23.31	24.95	26.63	30.11	31.89	35.53	46.96	58.99
		80	18.63	20.03	23.35	25.12	26.96	28.84	32.71	34.69	38.72	51.35	64.64
300		5	7.34	7.38	7.81	8.07	8.35	8.63	9.22	9.52	10.13	11.98	13.88
		10	9.08	9.20	9.83	10.20	10.59	11.00	11.83	12.25	13.12	15.84	18.73
		20	11.45	11.73	12.73	13.30	13.90	14.52	15.80	16.47	17.83	22.21	26.94
		30	13.24	13.69	15.05	15.81	16.61	17.44	19.17	20.06	21.91	27.85	34.24
		40	14.74	15.36	17.08	18.04	19.04	20.08	22.24	23.37	25.68	33.08	40.99
		60	17.30	18.26	20.71	22.06	23.46	24.90	27.91	29.46	32.65	42.74	53.43
		70	18.43	19.57	22.39	23.93	25.52	27.17	30.58	32.34	35.94	47.28	59.27
		80	19.49	20.81	24.00	25.73	27.52	29.36	33.17	35.12	39.12	51.67	64.91
400		5	7.93	7.96	8.40	8.68	8.97	9.26	9.87	10.18	10.80	12.69	14.61
		10	9.83	9.95	10.59	10.97	11.37	11.78	12.62	13.06	13.93	16.66	19.52
		20	12.41	12.68	13.67	14.25	14.84	15.46	16.73	17.39	18.74	23.04	27.67
		30	14.34	14.77	16.10	16.85	17.64	18.45	20.14	21.02	22.83	28.63	34.92
		40	15.97	16.54	18.21	19.14	20.12	21.12	23.23	24.32	26.57	33.82	41.63
		60	18.69	19.58	21.92	23.21	24.56	25.95	28.87	30.38	33.49	43.42	54.01
		70	19.88	20.93	23.61	25.09	26.62	28.21	31.51	33.23	36.75	47.93	59.83
		80	21.00	22.22	25.24	26.89	28.61	30.39	34.08	35.99	39.90	52.30	65.45

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 m (RADIUS = 8.5 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °C	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
0 (m*s) ^{1/2}	5	1.03	1.04	1.15	1.21	1.27	1.34	1.47	1.54	1.68	2.09	2.51
	10	1.15	1.19	1.34	1.43	1.51	1.60	1.78	1.87	2.05	2.60	3.15
	20	1.34	1.44	1.67	1.80	1.92	2.04	2.29	2.42	2.68	3.45	4.24
	30	1.51	1.65	1.96	2.12	2.27	2.43	2.75	2.91	3.22	4.20	5.19
	40	1.67	1.85	2.23	2.41	2.60	2.79	3.16	3.35	3.73	4.88	6.07
	60	1.96	2.22	2.71	2.96	3.20	3.44	3.92	4.17	4.65	6.14	7.67
	70	2.09	2.39	2.94	3.21	3.48	3.75	4.28	4.55	5.08	6.73	8.42
	80	2.22	2.55	3.16	3.46	3.75	4.04	4.62	4.91	5.50	7.29	9.14
10	5	1.30	1.29	1.36	1.41	1.46	1.52	1.64	1.70	1.83	2.22	2.62
	10	1.46	1.46	1.56	1.63	1.70	1.78	1.93	2.02	2.18	2.71	3.25
	20	1.68	1.71	1.88	1.98	2.09	2.20	2.43	2.55	2.79	3.54	4.32
	30	1.85	1.92	2.15	2.29	2.43	2.57	2.87	3.02	3.33	4.28	5.27
	40	2.01	2.10	2.41	2.57	2.74	2.92	3.28	3.46	3.83	4.96	6.14
	60	2.28	2.45	2.88	3.10	3.33	3.56	4.03	4.26	4.74	6.21	7.73
	70	2.41	2.61	3.10	3.35	3.60	3.86	4.38	4.64	5.17	6.79	8.48
	80	2.54	2.77	3.31	3.59	3.87	4.15	4.72	5.00	5.58	7.36	9.20
20	5	1.42	1.40	1.47	1.53	1.58	1.64	1.76	1.82	1.95	2.33	2.72
	10	1.61	1.60	1.70	1.77	1.84	1.91	2.06	2.14	2.30	2.81	3.34
	20	1.87	1.88	2.04	2.13	2.23	2.34	2.56	2.67	2.90	3.63	4.40
	30	2.06	2.11	2.32	2.44	2.57	2.71	2.99	3.13	3.43	4.36	5.34
	40	2.24	2.31	2.57	2.72	2.88	3.05	3.39	3.56	3.92	5.04	6.20
	60	2.53	2.66	3.03	3.24	3.45	3.68	4.13	4.36	4.83	6.28	7.79
	70	2.66	2.82	3.25	3.48	3.73	3.97	4.48	4.73	5.25	6.86	8.54
	80	2.79	2.98	3.46	3.72	3.99	4.26	4.81	5.09	5.66	7.42	9.25
50	5	1.64	1.62	1.69	1.74	1.80	1.86	1.99	2.05	2.18	2.57	2.97
	10	1.88	1.87	1.97	2.04	2.11	2.19	2.34	2.42	2.58	3.08	3.59
	20	2.21	2.22	2.37	2.46	2.56	2.66	2.87	2.98	3.20	3.89	4.62
	30	2.46	2.49	2.68	2.80	2.92	3.04	3.30	3.44	3.72	4.60	5.54
	40	2.67	2.72	2.95	3.09	3.24	3.39	3.70	3.86	4.20	5.26	6.39
	60	3.03	3.11	3.43	3.61	3.81	4.01	4.42	4.64	5.08	6.49	7.97
	70	3.18	3.29	3.65	3.86	4.07	4.30	4.76	5.00	5.50	7.06	8.71
	80	3.33	3.46	3.86	4.09	4.33	4.58	5.09	5.36	5.90	7.62	9.42
100	5	1.86	1.83	1.92	1.97	2.04	2.10	2.23	2.30	2.44	2.85	3.26
	10	2.17	2.15	2.26	2.33	2.41	2.49	2.65	2.73	2.90	3.41	3.92
	20	2.58	2.58	2.73	2.82	2.92	3.03	3.24	3.35	3.57	4.26	4.97
	30	2.89	2.91	3.09	3.21	3.33	3.45	3.71	3.85	4.12	4.97	5.88
	40	3.14	3.18	3.40	3.53	3.67	3.82	4.13	4.28	4.60	5.62	6.71
	60	3.56	3.63	3.92	4.10	4.28	4.47	4.86	5.06	5.48	6.82	8.26
	70	3.74	3.83	4.16	4.35	4.55	4.76	5.20	5.43	5.89	7.39	8.99
	80	3.91	4.01	4.38	4.59	4.81	5.05	5.53	5.78	6.29	7.93	9.69

SPACING = 12.0 m (RADIUS = 8.5 m)
 FIRE GROWTH: ULTRAFAST ($\alpha = .1875 \text{ kJ/s}^3$)

CEILING HEIGHT, m

RESPONSE
TIME INDEX

$(\text{m}^2\text{s})^{1/2}$

°C

1

2

4

5

6

7

9

10

12

18

24

150

5

2.01

2.37

2.84

3.19

3.48

3.95

4.15

4.34

4.43

4.55

4.79

5.00

5.21

5.44

5.65

5.84

6.04

6.25

6.46

6.67

6.88

7.09

7.30

7.51

7.72

7.93

8.14

8.35

8.56

200

5

2.14

2.54

3.06

3.44

3.75

4.01

4.27

4.49

4.69

4.88

5.07

5.27

5.48

5.69

5.90

6.11

6.32

6.53

6.74

6.95

7.16

7.37

7.58

7.79

8.00

8.21

8.42

8.63

8.84

250

5

2.25

2.68

3.24

3.65

3.99

4.54

4.77

4.99

5.07

5.24

5.41

5.58

5.75

5.92

6.13

6.34

6.55

6.76

6.97

7.18

7.39

7.60

7.81

8.02

8.23

8.44

8.65

8.86

9.07

300

5

2.35

2.80

3.40

3.84

4.19

4.78

5.03

5.26

5.34

5.51

5.68

5.85

6.02

6.23

6.44

6.65

6.86

7.07

7.28

7.49

7.70

7.91

8.12

8.33

8.54

8.75

8.96

9.17

9.38

400

5

2.51

3.02

3.68

4.16

4.55

5.19

5.47

5.72

5.79

5.96

6.13

6.34

6.55

6.76

6.97

7.18

7.39

7.60

7.81

8.02

8.23

8.44

8.65

8.86

9.07

9.28

9.49

9.70

9.91

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 m (RADIUS = 8.5 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0	5	1.48	1.52	1.71	1.81	1.92	2.03	2.25	2.36	2.58	3.27	3.96	
	10	1.71	1.82	2.10	2.25	2.40	2.55	2.86	3.02	3.33	4.28	5.25	
	20	2.10	2.31	2.76	2.99	3.21	3.44	3.89	4.12	4.58	5.98	7.42	
	30	2.44	2.74	3.34	3.63	3.92	4.22	4.80	5.09	5.68	7.48	9.33	
	40	2.75	3.14	3.87	4.23	4.58	4.93	5.63	5.98	6.69	8.85	11.08	
	60	3.33	3.87	4.85	5.31	5.77	6.23	7.15	7.61	8.54	11.36	14.28	
	70	3.60	4.21	5.30	5.82	6.33	6.84	7.86	8.37	9.40	12.54	15.78	
	80	3.85	4.54	5.74	6.31	6.87	7.43	8.55	9.11	10.23	13.67	17.23	
10	5	1.85	1.84	1.97	2.05	2.14	2.23	2.43	2.53	2.74	3.39	4.06	
	10	2.11	2.14	2.34	2.47	2.60	2.74	3.02	3.17	3.46	4.39	5.34	
	20	2.50	2.61	2.97	3.17	3.38	3.59	4.03	4.25	4.70	6.08	7.50	
	30	2.83	3.02	3.53	3.80	4.08	4.36	4.92	5.21	5.78	7.56	9.40	
	40	3.13	3.40	4.05	4.38	4.72	5.06	5.74	6.09	6.79	8.93	11.14	
	60	3.67	4.11	5.01	5.46	5.90	6.35	7.25	7.71	8.62	11.43	14.34	
	70	3.93	4.44	5.46	5.96	6.46	6.96	7.96	8.47	9.48	12.61	15.84	
	80	4.18	4.76	5.89	6.44	6.99	7.54	8.64	9.20	10.31	13.74	17.28	
20	5	2.02	2.01	2.13	2.22	2.30	2.40	2.59	2.69	2.89	3.52	4.17	
	10	2.33	2.35	2.53	2.65	2.77	2.90	3.17	3.31	3.60	4.49	5.43	
	20	2.77	2.85	3.17	3.35	3.55	3.75	4.16	4.38	4.81	6.17	7.58	
	30	3.12	3.27	3.72	3.97	4.23	4.49	5.04	5.32	5.89	7.64	9.47	
	40	3.43	3.65	4.23	4.54	4.86	5.19	5.86	6.20	6.88	9.00	11.21	
	60	3.98	4.34	5.17	5.60	6.03	6.47	7.36	7.80	8.71	11.50	14.40	
	70	4.24	4.66	5.61	6.10	6.58	7.07	8.06	8.56	9.57	12.67	15.90	
	80	4.49	4.98	6.04	6.58	7.11	7.65	8.74	9.29	10.39	13.80	17.34	
50	5	2.35	2.33	2.46	2.54	2.63	2.72	2.92	3.02	3.22	3.84	4.47	
	10	2.75	2.75	2.93	3.04	3.16	3.29	3.54	3.68	3.95	4.80	5.70	
	20	3.29	3.34	3.62	3.79	3.97	4.15	4.53	4.73	5.14	6.44	7.81	
	30	3.71	3.81	4.19	4.41	4.65	4.89	5.39	5.66	6.19	7.89	9.68	
	40	4.07	4.22	4.70	4.98	5.27	5.57	6.19	6.51	7.17	9.23	11.40	
	60	4.68	4.93	5.63	6.01	6.41	6.82	7.66	8.09	8.97	11.71	14.58	
	70	4.95	5.26	6.06	6.50	6.95	7.41	8.35	8.84	9.82	12.87	16.07	
	80	5.21	5.57	6.48	6.97	7.47	7.98	9.02	9.56	10.64	14.00	17.50	
100	5	2.69	2.67	2.80	2.89	2.98	3.08	3.28	3.39	3.59	4.23	4.87	
	10	3.18	3.18	3.36	3.47	3.60	3.72	3.99	4.12	4.39	5.24	6.11	
	20	3.84	3.88	4.15	4.32	4.49	4.67	5.04	5.23	5.62	6.86	8.18	
	30	4.34	4.42	4.78	4.99	5.21	5.44	5.91	6.16	6.67	8.29	10.02	
	40	4.76	4.88	5.32	5.58	5.85	6.12	6.71	7.01	7.63	9.61	11.73	
	60	5.47	5.66	6.28	6.63	6.99	7.37	8.15	8.56	9.40	12.05	14.87	
	70	5.78	6.02	6.72	7.11	7.52	7.94	8.83	9.29	10.23	13.20	16.35	
	80	6.07	6.35	7.14	7.57	8.03	8.51	9.49	10.00	11.04	14.32	17.78	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 m (RADIUS = 8.5 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s)^{1/2}

°C

	1	2	4	5	6	7	9	10	12	18	24
150	2.93	2.91	3.05	3.14	3.24	3.34	3.55	3.66	3.88	4.53	5.18
	3.49	3.49	3.68	3.79	3.92	4.05	4.32	4.46	4.74	5.60	6.47
	4.25	4.28	4.55	4.72	4.89	5.07	5.45	5.64	6.03	7.25	8.54
	4.81	4.88	5.23	5.44	5.65	5.88	6.35	6.59	7.09	8.67	10.36
	5.27	5.38	5.81	6.06	6.32	6.59	7.16	7.45	8.05	9.98	12.05
	6.05	6.23	6.81	7.14	7.49	7.85	8.61	9.00	9.81	12.39	15.16
	6.39	6.60	7.26	7.64	8.03	8.44	9.28	9.72	10.63	13.53	16.63
	6.71	6.95	7.69	8.11	8.54	8.99	9.94	10.42	11.43	14.63	18.05
200	3.13	3.11	3.25	3.34	3.45	3.55	3.77	3.88	4.11	4.78	5.45
	3.75	3.74	3.93	4.06	4.19	4.32	4.60	4.74	5.03	5.90	6.78
	4.57	4.60	4.88	5.05	5.22	5.41	5.79	5.98	6.37	7.60	8.88
	5.18	5.25	5.60	5.81	6.03	6.26	6.73	6.97	7.47	9.03	10.69
	5.69	5.79	6.21	6.46	6.72	7.00	7.56	7.85	8.44	10.33	12.36
	6.53	6.69	7.26	7.59	7.93	8.29	9.03	9.41	10.20	12.73	15.45
	6.90	7.09	7.73	8.10	8.48	8.88	9.71	10.13	11.02	13.86	16.91
	7.24	7.46	8.18	8.58	9.00	9.44	10.36	10.83	11.81	14.95	18.32
250	3.30	3.27	3.42	3.52	3.62	3.73	3.96	4.08	4.31	5.00	5.68
	3.96	3.96	4.15	4.28	4.42	4.56	4.84	4.99	5.28	6.17	7.06
	4.85	4.88	5.16	5.33	5.51	5.70	6.09	6.28	6.68	7.91	9.19
	5.51	5.57	5.92	6.13	6.36	6.59	7.06	7.31	7.80	9.36	11.00
	6.05	6.14	6.57	6.82	7.08	7.35	7.91	8.20	8.79	10.66	12.67
	6.94	7.10	7.66	7.99	8.33	8.68	9.41	9.79	10.57	13.05	15.74
	7.33	7.51	8.15	8.51	8.89	9.28	10.09	10.52	11.39	14.17	17.19
	7.69	7.90	8.61	9.00	9.42	9.85	10.75	11.22	12.18	15.26	18.59
300	3.44	3.42	3.57	3.67	3.78	3.90	4.13	4.25	4.48	5.19	5.89
	4.15	4.15	4.35	4.48	4.62	4.76	5.05	5.20	5.50	6.41	7.31
	5.10	5.12	5.41	5.58	5.77	5.96	6.35	6.55	6.96	8.20	9.48
	5.79	5.85	6.21	6.42	6.65	6.88	7.36	7.61	8.11	9.66	11.30
	6.37	6.45	6.88	7.13	7.40	7.67	8.24	8.53	9.12	10.98	12.96
	7.31	7.46	8.02	8.34	8.68	9.04	9.76	10.14	10.91	13.37	16.02
	7.72	7.89	8.52	8.88	9.26	9.65	10.46	10.87	11.73	14.49	17.46
	8.10	8.30	8.99	9.39	9.80	10.23	11.12	11.58	12.53	15.57	18.86
400	3.70	3.68	3.84	3.94	4.06	4.18	4.42	4.54	4.79	5.52	6.25
	4.49	4.48	4.69	4.82	4.97	5.12	5.42	5.58	5.89	6.83	7.76
	5.53	5.55	5.84	6.02	6.22	6.41	6.82	7.02	7.44	8.71	10.00
	6.29	6.34	6.71	6.93	7.16	7.40	7.89	8.14	8.65	10.22	11.86
	6.92	7.00	7.43	7.69	7.96	8.24	8.81	9.11	9.70	11.56	13.53
	7.95	8.08	8.64	8.97	9.31	9.67	10.40	10.77	11.54	13.97	16.57
	8.39	8.55	9.18	9.54	9.92	10.31	11.11	11.53	12.38	15.08	18.00
	8.80	8.99	9.68	10.07	10.48	10.91	11.79	12.24	13.18	16.16	19.38

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 m (RADIUS = 8.5 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s)^{1/2}

°C

1

2

4

5

6

7

9

10

12

18

24

0

5

10

20

30

40

60

70

80

10

20

30

40

50

100

5

10

20

30

40

60

70

80

10

20

30

40

50

60

70

80

10

20

30

40

50

60

70

80

90

100

110

120

130

140

150

160

170

180

190

200

210

220

230

240

250

260

270

280

290

300

310

320

330

340

350

360

370

380

390

400

410

420

430

440

450

460

470

480

490

500

510

520

530

540

550

560

570

580

590

600

610

620

630

640

650

660

670

680

690

700

710

720

730

740

750

760

770

780

790

800

810

820

830

840

850

860

870

880

890

900

910

920

930

940

950

960

970

980

990

1000

1010

1020

1030

1040

1050

1060

1070

1080

1090

1100

1110

1120

1130

1140

1150

1160

1170

1180

1190

1200

1210

1220

1230

1240

1250

1260

1270

1280

1290

1300

1310

1320

1330

1340

1350

1360

1370

1380

1390

1400

1410

1420

1430

1440

1450

1460

1470

1480

1490

1500

1510

1520

1530

1540

1550

1560

1570

1580

1590

1600

1610

1620

1630

1640

1650

1660

1670

1680

1690

1700

1710

1720

1730

1740

1750

1760

1770

1780

1790

1800

1810

1820

1830

1840

1850

1860

1870

1880

1890

1900

1910

1920

1930

1940

1950

1960

1970

1980

1990

2000

2010

2020

2030

2040

2050

2060

2070

2080

2090

2100

2110

2120

2130

2140

2150

2160

2170

2180

2190

2200

2210

2220

2230

2240

2250

2260

2270

2280

2290

2300

2310

2320

2330

2340

2350

2360

2370

2380

2390

2400

2410

2420

2430

2440

2450

2460

2470

2480

2490

2500

2510

2520

2530

2540

2550

2560

2570

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 m (RADIUS = 8.5 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
150	5	4.30	4.29	4.52	4.67	4.82	4.98	5.32	5.49	5.83	6.89	7.96	
	10	5.20	5.23	5.56	5.76	5.97	6.19	6.65	6.89	7.36	8.85	10.43	
	20	6.42	6.54	7.05	7.36	7.67	8.00	8.69	9.04	9.77	12.10	14.59	
	30	7.34	7.55	8.25	8.65	9.07	9.50	10.41	10.89	11.86	14.97	18.30	
	40	8.12	8.41	9.30	9.80	10.32	10.86	11.99	12.58	13.79	17.64	21.73	
	60	9.45	9.91	11.17	11.87	12.59	13.34	14.90	15.71	17.35	22.56	28.05	
	70	10.03	10.59	12.04	12.83	13.66	14.51	16.27	17.18	19.03	24.87	31.01	
	80	10.58	11.23	12.87	13.76	14.69	15.64	17.60	18.61	20.66	27.10	33.88	
200	5	4.60	4.59	4.82	4.98	5.14	5.30	5.65	5.82	6.17	7.25	8.34	
	10	5.59	5.62	5.95	6.15	6.37	6.59	7.06	7.29	7.77	9.27	10.83	
	20	6.92	7.02	7.54	7.84	8.15	8.48	9.16	9.51	10.23	12.52	14.97	
	30	7.92	8.10	8.79	9.18	9.59	10.02	10.91	11.37	12.32	15.37	18.64	
	40	8.75	9.02	9.87	10.36	10.87	11.39	12.49	13.06	14.24	18.01	22.05	
	60	10.16	10.59	11.79	12.45	13.15	13.88	15.39	16.17	17.78	22.90	28.34	
	70	10.78	11.29	12.66	13.42	14.21	15.03	16.74	17.63	19.44	25.20	31.30	
	80	11.36	11.95	13.50	14.35	15.24	16.16	18.06	19.04	21.06	27.42	34.15	
250	5	4.86	4.85	5.09	5.24	5.41	5.58	5.93	6.11	6.47	7.56	8.67	
	10	5.92	5.95	6.28	6.49	6.71	6.94	7.41	7.65	8.14	9.64	11.20	
	20	7.34	7.44	7.96	8.26	8.58	8.91	9.59	9.94	10.65	12.91	15.33	
	30	8.41	8.58	9.26	9.65	10.06	10.48	11.37	11.82	12.76	15.75	18.99	
	40	9.29	9.54	10.38	10.86	11.36	11.88	12.96	13.52	14.67	18.38	22.37	
	60	10.78	11.18	12.34	12.99	13.67	14.38	15.85	16.62	18.19	23.24	28.64	
	70	11.43	11.90	13.23	13.97	14.74	15.54	17.20	18.07	19.85	25.53	31.58	
	80	12.04	12.59	14.08	14.90	15.77	16.66	18.51	19.48	21.45	27.74	34.42	
300	5	5.09	5.08	5.32	5.48	5.65	5.83	6.19	6.37	6.74	7.85	8.97	
	10	6.21	6.24	6.58	6.79	7.02	7.25	7.73	7.97	8.47	9.98	11.54	
	20	7.72	7.82	8.33	8.64	8.96	9.29	9.97	10.32	11.04	13.29	15.68	
	30	8.84	9.01	9.68	10.07	10.48	10.91	11.79	12.24	13.17	16.13	19.32	
	40	9.78	10.01	10.84	11.32	11.82	12.33	13.40	13.95	15.09	18.74	22.69	
	60	11.33	11.71	12.85	13.49	14.16	14.85	16.30	17.05	18.60	23.58	28.93	
	70	12.01	12.46	13.76	14.48	15.23	16.02	17.65	18.50	20.25	25.85	31.86	
	80	12.64	13.17	14.62	15.42	16.26	17.13	18.95	19.90	21.84	28.06	34.70	
400	5	5.48	5.47	5.72	5.89	6.07	6.25	6.63	6.82	7.20	8.35	9.50	
	10	6.72	6.74	7.10	7.32	7.55	7.79	8.28	8.54	9.04	10.59	12.17	
	20	8.37	8.46	8.98	9.30	9.62	9.96	10.66	11.01	11.73	13.98	16.35	
	30	9.60	9.75	10.43	10.82	11.24	11.66	12.54	12.99	13.92	16.84	19.98	
	40	10.61	10.83	11.65	12.13	12.62	13.14	14.20	14.74	15.87	19.45	23.32	
	60	12.29	12.64	13.76	14.39	15.04	15.72	17.14	17.87	19.38	24.24	29.50	
	70	13.02	13.44	14.70	15.40	16.14	16.90	18.49	19.32	21.02	26.50	32.42	
	80	13.70	14.18	15.58	16.37	17.18	18.03	19.80	20.71	22.61	28.69	35.24	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 m (RADIUS = 8.5 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °C	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	5	3.34	3.63	4.28	4.61	4.94	5.27	5.95	6.29	6.97	9.04	11.17	
	10	4.26	4.80	5.85	6.36	6.87	7.38	8.40	8.92	9.95	13.10	16.34	
	20	5.82	6.78	8.49	9.31	10.12	10.92	12.53	13.34	14.96	19.92	25.04	
	30	7.19	8.51	10.80	11.89	12.96	14.03	16.15	17.21	19.35	25.89	32.66	
	40	8.44	10.10	12.93	14.26	15.58	16.88	19.47	20.77	23.38	31.38	39.66	
	60	10.74	13.01	16.83	18.61	20.36	22.10	25.56	27.29	30.77	41.44	52.48	
	70	11.82	14.38	18.65	20.64	22.60	24.54	28.40	30.34	34.23	46.14	58.47	
	80	12.85	15.69	20.40	22.60	24.76	26.89	31.15	33.28	37.56	50.67	64.25	
10	5	3.91	4.05	4.57	4.87	5.18	5.49	6.14	6.47	7.13	9.17	11.28	
	10	4.79	5.17	6.10	6.58	7.07	7.57	8.56	9.07	10.08	13.21	16.43	
	20	6.28	7.09	8.70	9.50	10.29	11.08	12.67	13.46	15.07	20.01	25.11	
	30	7.61	8.80	11.00	12.06	13.12	14.17	16.27	17.33	19.45	25.98	32.73	
	40	8.84	10.37	13.11	14.42	15.72	17.01	19.59	20.88	23.48	31.46	39.73	
	60	11.10	13.26	16.99	18.75	20.49	22.22	25.66	27.39	30.86	41.51	52.54	
	70	12.16	14.61	18.80	20.78	22.72	24.65	28.50	30.43	34.31	46.20	58.53	
	80	13.18	15.91	20.55	22.73	24.88	27.00	31.24	33.37	37.64	50.74	64.31	
20	5	4.29	4.39	4.85	5.12	5.41	5.71	6.33	6.64	7.29	9.30	11.39	
	10	5.22	5.51	6.35	6.80	7.27	7.75	8.72	9.22	10.22	13.32	16.53	
	20	6.71	7.40	8.91	9.68	10.46	11.23	12.80	13.59	15.19	20.10	25.19	
	30	8.01	9.08	11.19	12.23	13.27	14.31	16.39	17.44	19.56	26.06	32.80	
	40	9.22	10.63	13.29	14.58	15.86	17.14	19.70	20.99	23.58	31.54	39.79	
	60	11.45	13.49	17.15	18.90	20.62	22.34	25.76	27.48	30.95	41.58	52.60	
	70	12.50	14.84	18.96	20.92	22.85	24.77	28.60	30.52	34.39	46.27	58.59	
	80	13.51	16.14	20.71	22.87	25.00	27.11	31.34	33.46	37.72	50.80	64.36	
50	5	5.03	5.09	5.49	5.74	6.01	6.28	6.85	7.15	7.76	9.68	11.72	
	10	6.12	6.32	7.02	7.42	7.84	8.28	9.19	9.66	10.62	13.64	16.80	
	20	7.74	8.24	9.53	10.23	10.96	11.69	13.20	13.97	15.53	20.37	25.42	
	30	9.08	9.88	11.76	12.74	13.73	14.73	16.76	17.79	19.87	26.31	33.01	
	40	10.28	11.40	13.82	15.05	16.29	17.53	20.04	21.31	23.87	31.77	39.99	
	60	12.46	14.20	17.64	19.32	21.01	22.69	26.07	27.78	31.21	41.79	52.78	
	70	13.48	15.52	19.43	21.33	23.22	25.11	28.90	30.80	34.65	46.47	58.76	
	80	14.47	16.80	21.16	23.27	25.36	27.44	31.63	33.73	37.96	51.00	64.53	
100	5	5.81	5.85	6.24	6.49	6.75	7.01	7.57	7.85	8.44	10.29	12.25	
	10	7.11	7.26	7.90	8.27	8.66	9.07	9.92	10.36	11.27	14.17	17.26	
	20	8.95	9.33	10.46	11.09	11.75	12.44	13.86	14.59	16.10	20.83	25.81	
	30	10.41	11.03	12.66	13.55	14.47	15.42	17.36	18.36	20.38	26.72	33.36	
	40	11.68	12.56	14.69	15.82	16.99	18.18	20.60	21.84	24.35	32.15	40.31	
	60	13.92	15.33	18.43	20.03	21.65	23.28	26.58	28.26	31.65	42.13	53.07	
	70	14.95	16.62	20.19	22.01	23.84	25.68	29.39	31.27	35.07	46.81	59.04	
	80	15.94	17.88	21.90	23.93	25.96	27.99	32.10	34.18	38.37	51.32	64.81	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 m (RADIUS = 8.5 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
150	5	6.38	6.41	6.81	7.05	7.31	7.58	8.14	8.43	9.01	10.83	12.75	
	10	7.83	7.96	8.58	8.95	9.33	9.73	10.56	10.99	11.88	14.69	17.71	
	20	9.86	10.19	11.25	11.85	12.48	13.13	14.49	15.20	16.65	21.28	26.20	
	30	11.43	11.98	13.48	14.31	15.18	16.08	17.95	18.92	20.89	27.13	33.71	
	40	12.78	13.55	15.50	16.57	17.67	18.81	21.16	22.37	24.83	32.54	40.64	
	60	15.12	16.35	19.21	20.72	22.28	23.86	27.09	28.74	32.08	42.48	53.37	
	70	16.18	17.64	20.95	22.68	24.45	26.24	29.88	31.73	35.49	47.14	59.33	
	80	17.19	18.89	22.64	24.58	26.55	28.54	32.58	34.63	38.78	51.64	65.08	
200	5	6.84	6.87	7.27	7.52	7.78	8.06	8.62	8.91	9.50	11.32	13.23	
	10	8.42	8.54	9.16	9.52	9.91	10.30	11.13	11.55	12.42	15.19	18.15	
	20	10.60	10.91	11.93	12.52	13.13	13.76	15.09	15.77	17.19	21.72	26.58	
	30	12.28	12.78	14.21	15.01	15.85	16.72	18.53	19.47	21.40	27.54	34.06	
	40	13.70	14.40	16.25	17.27	18.33	19.43	21.71	22.89	25.30	32.92	40.97	
	60	16.15	17.26	19.95	21.40	22.90	24.43	27.60	29.21	32.51	42.83	53.66	
	70	17.25	18.57	21.68	23.34	25.05	26.79	30.37	32.19	35.90	47.47	59.61	
	80	18.29	19.82	23.36	25.22	27.13	29.08	33.05	35.07	39.18	51.97	65.36	
250	5	7.23	7.26	7.67	7.92	8.19	8.47	9.05	9.34	9.93	11.77	13.67	
	10	8.93	9.04	9.66	10.02	10.41	10.81	11.63	12.06	12.92	15.66	18.59	
	20	11.25	11.54	12.54	13.12	13.72	14.34	15.64	16.32	17.71	22.16	26.96	
	30	13.01	13.48	14.87	15.65	16.47	17.32	19.08	20.00	21.89	27.94	34.41	
	40	14.51	15.16	16.94	17.93	18.96	20.02	22.25	23.40	25.77	33.30	41.29	
	60	17.06	18.09	20.66	22.06	23.51	25.00	28.10	29.69	32.94	43.17	53.96	
	70	18.19	19.42	22.38	23.99	25.64	27.34	30.85	32.65	36.32	47.81	59.90	
	80	19.26	20.69	24.05	25.86	27.71	29.61	33.52	35.52	39.58	52.29	65.63	
300	5	7.58	7.60	8.02	8.28	8.56	8.84	9.42	9.72	10.32	12.17	14.08	
	10	9.38	9.48	10.10	10.47	10.86	11.26	12.09	12.52	13.38	16.11	19.01	
	20	11.82	12.09	13.09	13.66	14.26	14.88	16.17	16.83	18.20	22.60	27.34	
	30	13.67	14.11	15.48	16.24	17.05	17.88	19.62	20.52	22.38	28.34	34.75	
	40	15.23	15.85	17.58	18.54	19.55	20.59	22.77	23.90	26.23	33.67	41.61	
	60	17.87	18.84	21.32	22.68	24.10	25.56	28.59	30.16	33.37	43.52	54.25	
	70	19.04	20.20	23.06	24.61	26.22	27.89	31.33	33.10	36.73	48.14	60.18	
	80	20.14	21.48	24.72	26.47	28.28	30.15	33.99	35.96	39.98	52.61	65.91	
400	5	8.19	8.20	8.63	8.90	9.19	9.48	10.08	10.39	11.01	12.90	14.82	
	10	10.15	10.25	10.88	11.26	11.65	12.06	12.90	13.33	14.21	16.93	19.80	
	20	12.81	13.07	14.05	14.63	15.22	15.84	17.11	17.77	19.12	23.43	28.09	
	30	14.81	15.22	16.55	17.31	18.10	18.91	20.61	21.49	23.31	29.14	35.44	
	40	16.49	17.05	18.73	19.67	20.64	21.66	23.77	24.87	27.14	34.42	42.26	
	60	19.30	20.19	22.55	23.86	25.22	26.62	29.56	31.08	34.22	44.20	54.84	
	70	20.54	21.59	24.30	25.79	27.34	28.94	32.28	34.00	37.55	48.80	60.74	
	80	21.70	22.92	25.98	27.65	29.39	31.18	34.91	36.83	40.78	53.25	66.45	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.5 m (RADIUS = 8.8 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TEMPERATURE
 TIME INDEX RISE

CEILING HEIGHT, m

(m*s)^{1/2}

	0	1	2	4	5	6	7	9	10	12	18	24
5	1.07	1.08	1.18	1.24	1.30	1.37	1.50	1.57	1.71	2.12	2.54	
10	1.19	1.23	1.38	1.47	1.55	1.64	1.82	1.91	2.09	2.64	3.20	
20	1.39	1.49	1.72	1.85	1.97	2.10	2.35	2.47	2.73	3.51	4.30	
30	1.57	1.71	2.02	2.18	2.34	2.49	2.81	2.97	3.29	4.27	5.27	
40	1.73	1.92	2.30	2.49	2.67	2.86	3.24	3.43	3.81	4.97	6.16	
60	2.03	2.30	2.80	3.05	3.29	3.53	4.02	4.26	4.75	6.25	7.78	
70	2.17	2.47	3.03	3.31	3.58	3.85	4.38	4.65	5.19	6.84	8.54	
80	2.30	2.64	3.26	3.56	3.85	4.15	4.73	5.03	5.62	7.42	9.28	
10	1.35	1.33	1.40	1.45	1.50	1.56	1.68	1.74	1.86	2.25	2.65	
10	1.51	1.50	1.60	1.67	1.74	1.82	1.98	2.06	2.23	2.75	3.29	
20	1.74	1.76	1.93	2.03	2.14	2.25	2.48	2.60	2.85	3.60	4.38	
30	1.92	1.98	2.21	2.35	2.49	2.64	2.93	3.09	3.40	4.35	5.34	
40	2.08	2.17	2.48	2.64	2.82	2.99	3.35	3.54	3.90	5.04	6.22	
60	2.36	2.53	2.96	3.19	3.42	3.65	4.12	4.36	4.84	6.32	7.84	
70	2.50	2.70	3.19	3.45	3.70	3.96	4.48	4.75	5.28	6.91	8.60	
80	2.63	2.87	3.41	3.69	3.98	4.26	4.83	5.12	5.70	7.49	9.33	
20	1.47	1.45	1.52	1.57	1.62	1.68	1.80	1.86	1.98	2.36	2.75	
10	1.66	1.65	1.75	1.81	1.88	1.96	2.11	2.19	2.35	2.85	3.38	
20	1.93	1.94	2.09	2.19	2.29	2.39	2.61	2.73	2.96	3.69	4.46	
30	2.13	2.18	2.38	2.51	2.64	2.77	3.05	3.20	3.50	4.43	5.41	
40	2.31	2.38	2.64	2.80	2.96	3.12	3.47	3.64	4.00	5.12	6.29	
60	2.62	2.74	3.12	3.33	3.55	3.77	4.22	4.46	4.93	6.39	7.90	
70	2.75	2.91	3.35	3.58	3.83	4.07	4.58	4.84	5.36	6.98	8.66	
80	2.89	3.07	3.56	3.83	4.10	4.37	4.93	5.21	5.78	7.55	9.39	
50	1.69	1.67	1.74	1.79	1.85	1.91	2.03	2.09	2.22	2.61	3.00	
10	1.94	1.93	2.03	2.09	2.16	2.24	2.39	2.47	2.63	3.13	3.64	
20	2.29	2.29	2.43	2.52	2.62	2.72	2.93	3.04	3.26	3.95	4.69	
30	2.55	2.57	2.75	2.87	2.99	3.12	3.38	3.51	3.79	4.68	5.62	
40	2.76	2.81	3.03	3.17	3.32	3.47	3.78	3.95	4.28	5.35	6.49	
60	3.12	3.21	3.53	3.71	3.90	4.11	4.52	4.74	5.19	6.60	8.08	
70	3.28	3.39	3.75	3.96	4.18	4.40	4.87	5.12	5.61	7.18	8.83	
80	3.43	3.56	3.97	4.20	4.44	4.69	5.21	5.48	6.03	7.75	9.56	
100	1.92	1.89	1.97	2.02	2.08	2.15	2.28	2.35	2.48	2.89	3.30	
10	2.24	2.22	2.32	2.39	2.46	2.54	2.70	2.79	2.95	3.46	3.97	
20	2.66	2.66	2.80	2.90	3.00	3.10	3.31	3.42	3.64	4.32	5.04	
30	2.98	2.99	3.17	3.29	3.41	3.53	3.79	3.93	4.20	5.05	5.96	
40	3.24	3.27	3.49	3.62	3.77	3.91	4.22	4.37	4.70	5.72	6.81	
60	3.67	3.74	4.03	4.20	4.39	4.58	4.97	5.17	5.59	6.94	8.38	
70	3.86	3.94	4.27	4.47	4.67	4.88	5.32	5.54	6.01	7.51	9.12	
80	4.04	4.14	4.50	4.71	4.94	5.17	5.65	5.90	6.42	8.07	9.83	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.5 m (RADIUS = 8.8 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 150	5	2.08	2.05	2.13	2.19	2.26	2.32	2.46	2.53	2.67	3.10	3.52	
	10	2.45	2.43	2.53	2.61	2.68	2.77	2.94	3.02	3.19	3.72	4.24	
	20	2.93	2.93	3.08	3.17	3.27	3.38	3.60	3.71	3.94	4.63	5.34	
	30	3.29	3.30	3.49	3.60	3.73	3.85	4.12	4.25	4.52	5.38	6.27	
	40	3.59	3.61	3.83	3.97	4.11	4.26	4.56	4.72	5.04	6.05	7.11	
	60	4.07	4.13	4.42	4.59	4.77	4.96	5.34	5.54	5.96	7.26	8.66	
	70	4.28	4.35	4.68	4.87	5.06	5.27	5.70	5.92	6.38	7.83	9.40	
	80	4.48	4.56	4.92	5.13	5.34	5.57	6.04	6.28	6.78	8.38	10.10	
200	5	2.21	2.18	2.27	2.33	2.40	2.47	2.61	2.68	2.83	3.27	3.70	
	10	2.62	2.60	2.71	2.78	2.86	2.95	3.12	3.21	3.39	3.93	4.47	
	20	3.15	3.15	3.30	3.40	3.50	3.61	3.84	3.95	4.18	4.89	5.61	
	30	3.55	3.55	3.74	3.86	3.99	4.12	4.39	4.52	4.80	5.66	6.55	
	40	3.87	3.89	4.11	4.25	4.40	4.55	4.86	5.01	5.34	6.34	7.40	
	60	4.40	4.45	4.74	4.91	5.09	5.28	5.67	5.87	6.28	7.57	8.94	
	70	4.63	4.69	5.01	5.20	5.40	5.61	6.03	6.25	6.70	8.13	9.67	
	80	4.84	4.92	5.27	5.47	5.69	5.92	6.38	6.62	7.11	8.68	10.37	
250	5	2.32	2.30	2.38	2.45	2.52	2.59	2.74	2.81	2.96	3.42	3.86	
	10	2.76	2.74	2.85	2.93	3.02	3.11	3.29	3.38	3.56	4.12	4.67	
	20	3.34	3.33	3.49	3.59	3.70	3.81	4.04	4.16	4.40	5.12	5.85	
	30	3.76	3.77	3.96	4.08	4.21	4.35	4.62	4.76	5.04	5.91	6.81	
	40	4.11	4.13	4.36	4.50	4.64	4.80	5.11	5.27	5.60	6.61	7.66	
	60	4.68	4.73	5.02	5.19	5.37	5.56	5.95	6.15	6.56	7.85	9.21	
	70	4.92	4.98	5.30	5.49	5.69	5.90	6.33	6.55	7.00	8.42	9.93	
	80	5.15	5.22	5.57	5.78	6.00	6.22	6.69	6.93	7.42	8.97	10.63	
300	5	2.42	2.40	2.49	2.55	2.62	2.70	2.85	2.93	3.08	3.55	4.00	
	10	2.89	2.87	2.99	3.07	3.15	3.24	3.43	3.52	3.71	4.28	4.84	
	20	3.51	3.50	3.66	3.76	3.87	3.99	4.23	4.35	4.59	5.32	6.06	
	30	3.96	3.96	4.16	4.28	4.41	4.55	4.83	4.97	5.26	6.14	7.04	
	40	4.32	4.34	4.57	4.71	4.87	5.02	5.34	5.50	5.84	6.85	7.91	
	60	4.93	4.97	5.26	5.44	5.62	5.82	6.21	6.41	6.83	8.11	9.47	
	70	5.18	5.24	5.56	5.76	5.96	6.17	6.60	6.82	7.27	8.69	10.19	
	80	5.42	5.49	5.84	6.05	6.27	6.50	6.96	7.20	7.69	9.24	10.88	
400	5	2.60	2.57	2.66	2.73	2.80	2.88	3.04	3.12	3.29	3.77	4.24	
	10	3.11	3.09	3.21	3.30	3.39	3.48	3.68	3.78	3.98	4.57	5.15	
	20	3.79	3.78	3.95	4.06	4.18	4.30	4.54	4.67	4.92	5.68	6.44	
	30	4.29	4.29	4.49	4.62	4.76	4.90	5.19	5.34	5.64	6.55	7.46	
	40	4.69	4.71	4.95	5.09	5.25	5.41	5.74	5.91	6.25	7.29	8.36	
	60	5.35	5.39	5.69	5.87	6.06	6.26	6.67	6.87	7.29	8.59	9.94	
	70	5.64	5.69	6.02	6.21	6.42	6.63	7.07	7.30	7.75	9.17	10.67	
	80	5.90	5.96	6.32	6.53	6.75	6.98	7.46	7.70	8.19	9.73	11.37	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.5 m (RADIUS = 8.8 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	5	1.53	1.58	1.76	1.86	1.97	2.08	2.30	2.41	2.63	3.32	4.01	
	10	1.77	1.88	2.16	2.31	2.47	2.62	2.93	3.08	3.40	4.35	5.32	
	20	2.18	2.39	2.85	3.07	3.30	3.53	3.99	4.22	4.68	6.08	7.53	
	30	2.53	2.84	3.44	3.74	4.03	4.33	4.91	5.21	5.80	7.61	9.46	
	40	2.86	3.25	3.99	4.35	4.71	5.06	5.77	6.12	6.83	9.00	11.24	
	60	3.45	4.01	5.00	5.47	5.94	6.40	7.33	7.79	8.72	11.56	14.49	
	70	3.73	4.36	5.47	5.99	6.51	7.03	8.06	8.57	9.60	12.76	16.02	
	80	4.00	4.70	5.92	6.50	7.07	7.63	8.76	9.32	10.45	13.91	17.48	
10	5	1.91	1.90	2.02	2.10	2.19	2.29	2.49	2.59	2.80	3.45	4.12	
	10	2.18	2.21	2.41	2.53	2.67	2.80	3.09	3.24	3.53	4.46	5.41	
	20	2.59	2.70	3.06	3.26	3.47	3.69	4.12	4.34	4.79	6.18	7.61	
	30	2.93	3.12	3.64	3.91	4.19	4.47	5.04	5.32	5.91	7.69	9.53	
	40	3.24	3.52	4.17	4.51	4.85	5.19	5.88	6.23	6.93	9.08	11.31	
	60	3.81	4.25	5.16	5.62	6.07	6.52	7.43	7.89	8.81	11.63	14.55	
	70	4.07	4.59	5.63	6.13	6.64	7.14	8.16	8.66	9.69	12.83	16.07	
	80	4.33	4.93	6.08	6.63	7.19	7.75	8.86	9.41	10.54	13.98	17.54	
20	5	2.09	2.08	2.19	2.27	2.36	2.45	2.64	2.74	2.94	3.57	4.23	
	10	2.41	2.42	2.60	2.72	2.84	2.97	3.24	3.38	3.67	4.57	5.51	
	20	2.86	2.94	3.26	3.44	3.64	3.84	4.26	4.47	4.91	6.27	7.68	
	30	3.23	3.37	3.83	4.08	4.34	4.61	5.16	5.44	6.01	7.77	9.60	
	40	3.55	3.77	4.35	4.67	4.99	5.32	6.00	6.34	7.03	9.16	11.37	
	60	4.12	4.48	5.33	5.76	6.20	6.64	7.53	7.99	8.90	11.70	14.61	
	70	4.39	4.82	5.78	6.27	6.76	7.26	8.26	8.76	9.77	12.90	16.13	
	80	4.64	5.15	6.23	6.77	7.31	7.86	8.95	9.51	10.62	14.05	17.59	
50	5	2.43	2.41	2.52	2.61	2.69	2.79	2.98	3.08	3.28	3.89	4.53	
	10	2.84	2.84	3.01	3.12	3.24	3.36	3.62	3.75	4.02	4.88	5.78	
	20	3.40	3.45	3.72	3.89	4.07	4.25	4.63	4.83	5.24	6.54	7.92	
	30	3.83	3.93	4.31	4.53	4.77	5.01	5.52	5.78	6.32	8.02	9.82	
	40	4.20	4.35	4.84	5.11	5.40	5.71	6.33	6.66	7.32	9.39	11.57	
	60	4.83	5.09	5.79	6.18	6.58	6.99	7.84	8.28	9.16	11.91	14.79	
	70	5.12	5.43	6.24	6.68	7.13	7.60	8.55	9.04	10.03	13.10	16.30	
	80	5.39	5.75	6.67	7.16	7.67	8.19	9.24	9.78	10.87	14.24	17.76	
100	5	2.78	2.75	2.87	2.96	3.05	3.15	3.35	3.45	3.66	4.29	4.93	
	10	3.28	3.28	3.45	3.56	3.68	3.81	4.07	4.21	4.48	5.32	6.20	
	20	3.97	4.00	4.27	4.43	4.60	4.78	5.15	5.34	5.73	6.98	8.30	
	30	4.48	4.56	4.91	5.12	5.34	5.57	6.05	6.29	6.80	8.43	10.17	
	40	4.92	5.03	5.47	5.72	5.99	6.27	6.86	7.16	7.78	9.77	11.90	
	60	5.64	5.84	6.45	6.80	7.17	7.55	8.34	8.75	9.59	12.26	15.09	
	70	5.96	6.20	6.91	7.30	7.72	8.14	9.04	9.50	10.44	13.43	16.59	
	80	6.26	6.54	7.34	7.78	8.24	8.72	9.71	10.22	11.27	14.57	18.04	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.5 m (RADIUS = 8.8 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	3.03	3.00	3.13	3.22	3.31	3.42	3.63	3.73	3.95	4.60	5.25
	10	3.60	3.59	3.77	3.89	4.02	4.15	4.42	4.55	4.83	5.68	6.56
	20	4.38	4.41	4.67	4.84	5.01	5.19	5.56	5.75	6.14	7.37	8.66
	30	4.96	5.02	5.37	5.58	5.79	6.02	6.49	6.73	7.23	8.81	10.51
	40	5.44	5.54	5.96	6.21	6.48	6.75	7.32	7.61	8.21	10.15	12.22
	60	6.24	6.41	7.00	7.33	7.68	8.05	8.80	9.20	10.01	12.61	15.39
	70	6.59	6.80	7.46	7.84	8.23	8.64	9.50	9.94	10.85	13.77	16.88
	80	6.92	7.17	7.91	8.33	8.76	9.22	10.17	10.66	11.67	14.89	18.32
200	5	3.23	3.20	3.33	3.43	3.53	3.63	3.85	3.96	4.18	4.85	5.52
	10	3.87	3.85	4.04	4.16	4.29	4.42	4.70	4.84	5.12	5.99	6.88
	20	4.72	4.74	5.01	5.17	5.35	5.53	5.91	6.10	6.50	7.72	9.00
	30	5.35	5.40	5.75	5.96	6.18	6.40	6.88	7.12	7.61	9.18	10.84
	40	5.87	5.96	6.38	6.63	6.89	7.16	7.72	8.01	8.61	10.50	12.54
	60	6.74	6.89	7.46	7.79	8.13	8.49	9.23	9.61	10.41	12.94	15.68
	70	7.11	7.30	7.94	8.31	8.70	9.09	9.92	10.36	11.24	14.09	17.16
	80	7.46	7.69	8.40	8.81	9.23	9.67	10.59	11.07	12.05	15.21	18.59
250	5	3.40	3.37	3.51	3.61	3.71	3.82	4.04	4.16	4.39	5.07	5.76
	10	4.09	4.08	4.26	4.39	4.52	4.66	4.94	5.09	5.38	6.26	7.16
	20	5.00	5.02	5.30	5.47	5.65	5.83	6.22	6.41	6.81	8.04	9.32
	30	5.68	5.73	6.08	6.29	6.51	6.74	7.22	7.46	7.96	9.51	11.16
	40	6.24	6.32	6.74	6.99	7.25	7.53	8.09	8.38	8.97	10.84	12.85
	60	7.16	7.31	7.87	8.19	8.53	8.89	9.62	10.00	10.78	13.27	15.97
	70	7.56	7.74	8.37	8.73	9.11	9.50	10.32	10.74	11.62	14.42	17.44
	80	7.93	8.14	8.84	9.24	9.66	10.09	10.99	11.46	12.43	15.52	18.86
300	5	3.55	3.52	3.67	3.77	3.87	3.98	4.21	4.33	4.57	5.27	5.97
	10	4.29	4.27	4.46	4.59	4.73	4.87	5.16	5.31	5.61	6.51	7.41
	20	5.26	5.28	5.55	5.73	5.91	6.10	6.49	6.69	7.09	8.33	9.61
	30	5.98	6.02	6.37	6.59	6.81	7.04	7.52	7.77	8.27	9.82	11.46
	40	6.57	6.64	7.06	7.32	7.58	7.85	8.42	8.71	9.30	11.16	13.15
	60	7.54	7.68	8.23	8.56	8.90	9.25	9.98	10.36	11.13	13.59	16.26
	70	7.96	8.13	8.75	9.11	9.49	9.88	10.69	11.11	11.97	14.73	17.72
	80	8.35	8.55	9.24	9.63	10.05	10.48	11.37	11.83	12.78	15.83	19.13
400	5	3.82	3.79	3.94	4.04	4.15	4.27	4.51	4.63	4.88	5.61	6.33
	10	4.63	4.61	4.81	4.95	5.09	5.24	5.54	5.69	6.00	6.93	7.87
	20	5.70	5.71	6.00	6.18	6.37	6.56	6.96	7.17	7.58	8.85	10.14
	30	6.48	6.53	6.88	7.10	7.33	7.57	8.06	8.31	8.82	10.39	12.03
	40	7.13	7.20	7.63	7.88	8.15	8.43	9.00	9.30	9.89	11.75	13.72
	60	8.19	8.32	8.87	9.20	9.54	9.90	10.63	11.00	11.77	14.20	16.81
	70	8.65	8.80	9.42	9.78	10.16	10.55	11.36	11.77	12.62	15.34	18.26
	80	9.07	9.25	9.94	10.33	10.74	11.17	12.05	12.51	13.44	16.43	19.67

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.5 m (RADIUS = 8.8 m)³
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	5	2.26	2.38	2.73	2.91	3.09	3.28	3.66	3.85	4.24	5.41	6.60	
	10	2.74	2.99	3.54	3.81	4.09	4.36	4.92	5.20	5.76	7.47	9.22	
	20	3.55	4.02	4.90	5.33	5.76	6.18	7.04	7.46	8.32	10.94	13.64	
	30	4.26	4.91	6.10	6.66	7.22	7.78	8.89	9.45	10.57	13.99	17.51	
	40	4.91	5.74	7.19	7.89	8.57	9.24	10.60	11.27	12.63	16.78	21.06	
	60	6.11	7.25	9.20	10.12	11.03	11.93	13.72	14.61	16.41	21.90	27.57	
	70	6.66	7.95	10.14	11.17	12.18	13.18	15.17	16.17	18.17	24.29	30.61	
	80	7.20	8.64	11.05	12.18	13.29	14.39	16.58	17.68	19.88	26.60	33.55	
10	5	2.75	2.77	3.02	3.17	3.33	3.50	3.85	4.03	4.40	5.54	6.71	
	10	3.23	3.35	3.79	4.04	4.29	4.55	5.08	5.35	5.90	7.58	9.32	
	20	4.00	4.33	5.12	5.52	5.93	6.34	7.17	7.59	8.44	11.03	13.72	
	30	4.68	5.20	6.29	6.84	7.38	7.92	9.02	9.57	10.67	14.07	17.58	
	40	5.31	6.01	7.38	8.05	8.71	9.38	10.71	11.38	12.73	16.86	21.13	
	60	6.46	7.49	9.37	10.27	11.16	12.05	13.82	14.71	16.50	21.97	27.63	
	70	7.01	8.19	10.30	11.31	12.31	13.30	15.27	16.27	18.26	24.36	30.67	
	80	7.54	8.86	11.20	12.32	13.41	14.50	16.68	17.77	19.96	26.67	33.61	
20	5	3.02	3.03	3.25	3.39	3.54	3.70	4.03	4.21	4.56	5.67	6.82	
	10	3.56	3.64	4.03	4.25	4.49	4.73	5.24	5.50	6.04	7.69	9.41	
	20	4.37	4.63	5.33	5.71	6.10	6.50	7.31	7.72	8.55	11.13	13.80	
	30	5.06	5.48	6.48	7.01	7.53	8.06	9.14	9.68	10.78	14.15	17.65	
	40	5.67	6.27	7.56	8.21	8.86	9.51	10.83	11.49	12.83	16.94	21.20	
	60	6.81	7.73	9.53	10.42	11.29	12.17	13.92	14.81	16.58	22.04	27.69	
	70	7.35	8.42	10.46	11.45	12.43	13.41	15.37	16.36	18.34	24.43	30.73	
	80	7.86	9.09	11.36	12.45	13.54	14.62	16.78	17.86	20.04	26.73	33.66	
50	5	3.53	3.52	3.73	3.87	4.01	4.17	4.48	4.65	4.98	6.04	7.14	
	10	4.20	4.25	4.58	4.78	5.00	5.22	5.69	5.93	6.43	8.01	9.69	
	20	5.15	5.32	5.90	6.24	6.59	6.95	7.71	8.10	8.90	11.40	14.03	
	30	5.90	6.20	7.04	7.50	7.99	8.48	9.51	10.03	11.09	14.40	17.86	
	40	6.56	6.99	8.08	8.68	9.28	9.90	11.17	11.81	13.12	17.17	21.39	
	60	7.72	8.42	10.02	10.85	11.68	12.53	14.24	15.10	16.85	22.25	27.87	
	70	8.26	9.09	10.93	11.87	12.81	13.76	15.67	16.64	18.60	24.63	30.90	
	80	8.77	9.74	11.81	12.85	13.90	14.95	17.07	18.13	20.29	26.93	33.83	
100	5	4.06	4.04	4.25	4.39	4.54	4.70	5.02	5.19	5.52	6.56	7.64	
	10	4.87	4.91	5.22	5.42	5.63	5.85	6.30	6.54	7.02	8.53	10.14	
	20	6.00	6.13	6.65	6.96	7.29	7.63	8.33	8.70	9.45	11.86	14.42	
	30	6.86	7.09	7.83	8.25	8.69	9.14	10.10	10.59	11.60	14.82	18.22	
	40	7.60	7.93	8.88	9.41	9.96	10.54	11.73	12.34	13.60	17.56	21.72	
	60	8.87	9.41	10.79	11.54	12.32	13.11	14.75	15.58	17.29	22.60	28.17	
	70	9.43	10.09	11.68	12.54	13.42	14.32	16.17	17.11	19.02	24.97	31.19	
	80	9.97	10.74	12.55	13.51	14.50	15.50	17.55	18.59	20.70	27.26	34.11	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.5 m (RADIUS = 8.8 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
	5	4.44	4.42	4.64	4.78	4.94	5.10	5.43	5.60	5.94	6.99	8.07	
	10	5.36	5.39	5.71	5.91	6.12	6.34	6.79	7.03	7.50	9.00	10.57	
	20	6.62	6.73	7.25	7.55	7.86	8.19	8.88	9.24	9.97	12.30	14.80	
	30	7.58	7.78	8.47	8.88	9.30	9.74	10.65	11.12	12.10	15.23	18.57	
	40	8.38	8.67	9.56	10.06	10.58	11.13	12.27	12.86	14.07	17.94	22.05	
	60	9.75	10.22	11.49	12.19	12.92	13.68	15.25	16.06	17.72	22.95	28.47	
	70	10.35	10.92	12.38	13.19	14.02	14.88	16.66	17.57	19.44	25.31	31.48	
80	10.92	11.58	13.24	14.15	15.08	16.04	18.02	19.03	21.10	27.58	34.39		
200	5	4.75	4.73	4.95	5.10	5.26	5.43	5.77	5.94	6.29	7.36	8.45	
	10	5.76	5.78	6.11	6.31	6.52	6.75	7.21	7.44	7.92	9.42	10.98	
	20	7.14	7.23	7.74	8.04	8.36	8.68	9.36	9.71	10.43	12.72	15.18	
	30	8.17	8.34	9.02	9.42	9.83	10.26	11.16	11.62	12.57	15.63	18.92	
	40	9.03	9.29	10.14	10.63	11.14	11.67	12.78	13.35	14.53	18.32	22.38	
	60	10.48	10.91	12.12	12.79	13.49	14.22	15.74	16.53	18.15	23.30	28.77	
	70	11.12	11.63	13.02	13.79	14.59	15.41	17.14	18.03	19.86	25.64	31.76	
	80	11.72	12.32	13.88	14.75	15.64	16.57	18.49	19.48	21.51	27.91	34.66	
250	5	5.02	4.99	5.22	5.38	5.54	5.71	6.06	6.24	6.59	7.68	8.78	
	10	6.11	6.12	6.45	6.66	6.88	7.10	7.57	7.81	8.29	9.79	11.35	
	20	7.57	7.66	8.17	8.47	8.79	9.12	9.80	10.15	10.86	13.13	15.55	
	30	8.67	8.84	9.51	9.90	10.31	10.74	11.62	12.08	13.02	16.02	19.26	
	40	9.59	9.83	10.67	11.15	11.65	12.17	13.25	13.81	14.97	18.70	22.70	
	60	11.12	11.52	12.68	13.34	14.02	14.73	16.22	16.99	18.57	23.64	29.06	
	70	11.79	12.27	13.60	14.34	15.12	15.93	17.61	18.48	20.27	25.97	32.05	
	80	12.42	12.97	14.48	15.31	16.18	17.08	18.95	19.92	21.91	28.23	34.94	
300	5	5.25	5.23	5.46	5.62	5.79	5.96	6.32	6.50	6.86	7.97	9.09	
	10	6.41	6.42	6.75	6.96	7.19	7.42	7.89	8.14	8.63	10.14	11.70	
	20	7.96	8.05	8.55	8.86	9.18	9.51	10.19	10.54	11.26	13.51	15.91	
	30	9.12	9.28	9.94	10.33	10.74	11.17	12.05	12.50	13.43	16.40	19.60	
	40	10.08	10.31	11.14	11.61	12.11	12.63	13.70	14.25	15.40	19.06	23.03	
	60	11.69	12.06	13.20	13.85	14.52	15.22	16.67	17.43	18.99	23.99	29.36	
	70	12.39	12.84	14.14	14.86	15.62	16.41	18.06	18.91	20.67	26.31	32.33	
	80	13.04	13.56	15.02	15.84	16.68	17.56	19.39	20.35	22.30	28.55	35.21	
400	5	5.66	5.63	5.87	6.04	6.21	6.39	6.77	6.95	7.33	8.48	9.63	
	10	6.93	6.94	7.28	7.50	7.73	7.97	8.46	8.71	9.22	10.76	12.34	
	20	8.63	8.71	9.22	9.53	9.86	10.19	10.89	11.24	11.96	14.21	16.59	
	30	9.89	10.04	10.71	11.10	11.51	11.94	12.82	13.27	14.19	17.12	20.27	
	40	10.94	11.15	11.97	12.44	12.94	13.45	14.51	15.06	16.18	19.78	23.66	
	60	12.67	13.02	14.13	14.76	15.42	16.10	17.52	18.26	19.78	24.66	29.94	
	70	13.43	13.84	15.10	15.81	16.55	17.31	18.91	19.74	21.46	26.96	32.90	
	80	14.13	14.61	16.01	16.80	17.62	18.47	20.25	21.17	23.08	29.19	35.76	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.5 m (RADIUS = 8.8 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m												
			0	1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}	°C													
0	5		3.46	4.41	4.74	5.07	5.41	6.09	6.43	7.11	7.28	9.32	11.44	
	10		4.43	6.03	6.55	7.06	7.58	8.60	9.12	10.16	10.30	13.43	16.67	
	20		6.04	8.76	9.58	10.40	11.21	12.84	13.65	15.28	15.40	20.36	25.48	
	30		7.46	11.15	12.25	13.33	14.41	16.55	17.62	19.77	19.88	26.44	33.22	
	40		8.77	13.34	14.69	16.02	17.34	19.95	21.27	23.90	24.00	32.02	40.32	
	60		11.16	17.36	19.17	20.95	22.70	26.20	27.94	31.45	31.54	42.25	53.33	
	70		12.27	19.24	21.27	23.25	25.21	29.11	31.06	34.98	35.07	47.03	59.42	
	80		13.35	21.06	23.29	25.47	27.63	31.93	34.07	38.39	38.47	51.65	65.29	
10	5		4.04	4.71	5.01	5.32	5.63	6.28	6.61	7.28	7.44	9.46	11.55	
	10		4.96	6.28	6.77	7.27	7.76	8.77	9.27	10.30	10.43	13.54	16.76	
	20		6.51	8.97	9.78	10.57	11.37	12.97	13.78	15.40	15.51	20.45	25.56	
	30		7.89	11.34	12.42	13.49	14.55	16.67	17.74	19.88	19.98	26.52	33.29	
	40		9.17	13.52	14.85	16.17	17.47	20.07	21.37	24.00	24.09	32.10	40.39	
	60		11.52	17.53	19.32	21.08	22.82	26.30	28.04	31.54	31.63	42.32	53.39	
	70		12.62	19.40	21.41	23.38	25.33	29.21	31.16	35.07	35.15	47.10	59.47	
	80		13.68	21.21	23.42	25.59	27.74	32.02	34.17	38.47	38.55	51.71	65.34	
20	5		4.44	4.99	5.26	5.55	5.85	6.47	6.79	7.44	7.60	9.84	11.88	
	10		5.40	6.54	7.00	7.47	7.95	8.93	9.43	10.43	10.54	13.87	17.04	
	20		6.95	9.19	9.96	10.75	11.53	13.11	13.91	15.51	15.66	20.73	25.80	
	30		8.30	11.54	12.59	13.64	14.69	16.80	17.85	19.98	20.09	26.77	33.50	
	40		9.56	13.71	15.01	16.31	17.60	20.19	21.48	24.09	24.18	32.33	40.59	
	60		11.87	17.69	19.46	21.21	22.94	26.40	28.14	31.63	31.72	42.53	53.57	
	70		12.96	19.56	21.55	23.50	25.44	29.31	31.25	35.15	35.24	47.31	59.65	
	80		14.02	21.36	23.56	25.71	27.85	32.12	34.26	38.55	38.64	51.91	65.51	
50	5		5.19	5.65	5.89	6.16	6.43	7.00	7.30	7.91	8.07	10.45	12.42	
	10		6.33	7.22	7.62	8.05	8.49	9.41	9.88	10.84	10.94	14.41	17.51	
	20		8.00	9.81	10.52	11.25	12.00	13.52	14.29	15.86	15.96	21.19	26.19	
	30		9.39	12.11	13.10	14.11	15.12	17.17	18.20	20.30	20.39	27.19	33.86	
	40		10.63	14.25	15.49	16.74	18.00	20.53	21.81	24.39	24.48	32.72	40.92	
	60		12.90	18.18	19.90	21.60	23.30	26.72	28.43	31.90	32.00	42.89	53.87	
	70		13.96	20.03	21.96	23.88	25.79	29.61	31.54	35.41	35.50	47.65	59.94	
	80		14.99	21.82	23.96	26.08	28.19	32.41	34.53	38.80	38.89	52.24	65.79	
100	5		6.00	6.41	6.66	6.91	7.18	7.73	8.02	8.60	8.76	10.45	12.42	
	10		7.34	8.11	8.49	8.88	9.29	10.15	10.59	11.50	11.60	14.41	17.51	
	20		9.24	10.76	11.40	12.06	12.75	14.18	14.92	16.43	16.53	21.19	26.19	
	30		10.75	13.03	13.93	14.86	15.81	17.78	18.78	20.82	20.92	27.19	33.86	
	40		12.06	15.12	16.27	17.45	18.65	21.10	22.35	24.88	24.98	32.72	40.92	
	60		14.39	18.99	20.61	22.25	23.90	27.24	28.92	32.34	32.44	42.89	53.87	
	70		15.46	20.81	22.65	24.50	26.36	30.11	32.01	35.84	35.94	47.65	59.94	
	80		16.48	22.58	24.63	26.68	28.75	32.90	34.99	39.21	39.30	52.24	65.79	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.5 m (RADIUS = 8.8 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	6.58	6.60	6.99	7.23	7.49	7.76	8.32	8.60	9.19	11.01	12.93
	10	8.08	8.20	8.82	9.18	9.57	9.97	10.80	11.23	12.11	14.94	17.96
	20	10.17	10.50	11.56	12.17	12.80	13.46	14.83	15.54	17.00	21.65	26.58
	30	11.80	12.35	13.86	14.70	15.58	16.49	18.37	19.35	21.34	27.61	34.21
	40	13.19	13.97	15.95	17.03	18.15	19.30	21.67	22.88	25.36	33.11	41.25
	60	15.62	16.87	19.78	21.32	22.89	24.49	27.75	29.41	32.78	43.24	54.17
	70	16.72	18.21	21.58	23.34	25.12	26.93	30.61	32.48	36.26	47.98	60.23
	80	17.77	19.50	23.32	25.29	27.29	29.30	33.38	35.44	39.62	52.57	66.07
200	5	7.06	7.07	7.46	7.71	7.97	8.25	8.81	9.10	9.68	11.51	13.41
	10	8.69	8.80	9.40	9.77	10.15	10.55	11.37	11.80	12.67	15.44	18.41
	20	10.94	11.24	12.26	12.85	13.46	14.10	15.43	16.12	17.54	22.10	26.97
	30	12.67	13.17	14.61	15.42	16.26	17.13	18.96	19.90	21.85	28.02	34.57
	40	14.14	14.85	16.71	17.74	18.82	19.92	22.22	23.41	25.84	33.50	41.58
	60	16.68	17.80	20.53	22.00	23.52	25.07	28.26	29.89	33.21	43.59	54.47
	70	17.81	19.16	22.32	24.01	25.73	27.50	31.10	32.94	36.68	48.32	60.51
	80	18.89	20.46	24.05	25.95	27.88	29.85	33.86	35.89	40.03	52.90	66.35
250	5	7.46	7.47	7.87	8.12	8.39	8.67	9.24	9.53	10.13	11.96	13.86
	10	9.21	9.31	9.91	10.28	10.66	11.06	11.89	12.31	13.18	15.92	18.85
	20	11.60	11.88	12.88	13.46	14.06	14.69	16.00	16.67	18.07	22.54	27.36
	30	13.43	13.89	15.28	16.07	16.89	17.74	19.52	20.45	22.35	28.43	34.92
	40	14.97	15.62	17.42	18.41	19.45	20.53	22.77	23.93	26.31	33.88	41.91
	60	17.61	18.65	21.25	22.67	24.14	25.65	28.77	30.37	33.65	43.94	54.77
	70	18.78	20.02	23.04	24.66	26.34	28.05	31.59	33.41	37.10	48.66	60.80
	80	19.89	21.34	24.76	26.59	28.47	30.39	34.33	36.34	40.44	53.22	66.62
300	5	7.82	7.83	8.23	8.49	8.76	9.04	9.62	9.92	10.52	12.37	14.27
	10	9.67	9.76	10.37	10.74	11.13	11.53	12.35	12.78	13.65	16.38	19.28
	20	12.19	12.46	13.44	14.02	14.62	15.24	16.53	17.19	18.57	22.98	27.74
	30	14.10	14.54	15.90	16.67	17.48	18.32	20.06	20.97	22.84	28.83	35.27
	40	15.71	16.33	18.07	19.04	20.05	21.11	23.30	24.44	26.78	34.26	42.24
	60	18.44	19.42	21.93	23.31	24.73	26.21	29.27	30.85	34.08	44.29	55.07
	70	19.65	20.82	23.72	25.29	26.93	28.61	32.08	33.87	37.52	48.99	61.09
	80	20.79	22.15	25.44	27.21	29.05	30.93	34.80	36.79	40.85	53.55	66.90
400	5	8.44	8.45	8.86	9.13	9.41	9.70	10.30	10.60	11.22	13.10	15.03
	10	10.47	10.55	11.17	11.54	11.94	12.34	13.18	13.61	14.49	17.21	20.08
	20	13.21	13.45	14.43	15.00	15.60	16.21	17.49	18.15	19.51	23.83	28.50
	30	15.27	15.67	17.00	17.76	18.55	19.37	21.08	21.96	23.78	29.64	35.96
	40	17.00	17.56	19.24	20.19	21.17	22.19	24.32	25.42	27.70	35.02	42.89
	60	19.91	20.80	23.19	24.50	25.87	27.29	30.25	31.78	34.94	44.98	55.66
	70	21.19	22.25	24.99	26.50	28.06	29.68	33.04	34.78	38.35	49.66	61.66
	80	22.39	23.63	26.72	28.41	30.17	31.98	35.74	37.68	41.65	54.20	67.46

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.0 m (RADIUS = 9.2 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
0	5	1.11	1.12	1.21	1.27	1.34	1.40	1.54	1.60	1.74	2.15	2.57	
	10	1.23	1.27	1.42	1.51	1.59	1.68	1.86	1.95	2.13	2.68	3.24	
	20	1.44	1.54	1.77	1.90	2.02	2.15	2.40	2.53	2.78	3.56	4.36	
	30	1.63	1.77	2.08	2.24	2.40	2.56	2.88	3.04	3.36	4.34	5.34	
	40	1.80	1.98	2.37	2.56	2.74	2.93	3.31	3.50	3.88	5.05	6.24	
	60	2.11	2.37	2.88	3.13	3.38	3.62	4.11	4.36	4.85	6.35	7.90	
	70	2.25	2.56	3.13	3.40	3.67	3.94	4.49	4.76	5.30	6.96	8.67	
	80	2.39	2.73	3.36	3.66	3.96	4.26	4.85	5.14	5.74	7.55	9.44	
10	5	1.40	1.37	1.43	1.48	1.54	1.59	1.71	1.77	1.90	2.28	2.68	
	10	1.56	1.55	1.65	1.71	1.78	1.86	2.02	2.10	2.27	2.79	3.33	
	20	1.79	1.82	1.98	2.08	2.19	2.31	2.54	2.66	2.90	3.66	4.44	
	30	1.98	2.04	2.28	2.41	2.55	2.70	3.00	3.15	3.46	4.42	5.41	
	40	2.15	2.24	2.55	2.72	2.89	3.07	3.43	3.61	3.98	5.13	6.31	
	60	2.44	2.62	3.05	3.28	3.51	3.74	4.22	4.46	4.94	6.42	7.96	
	70	2.58	2.79	3.29	3.54	3.80	4.06	4.59	4.85	5.39	7.03	8.73	
	80	2.71	2.96	3.51	3.80	4.08	4.37	4.94	5.23	5.82	7.61	9.47	
20	5	1.52	1.49	1.56	1.60	1.66	1.71	1.83	1.89	2.02	2.40	2.79	
	10	1.72	1.70	1.79	1.86	1.93	2.00	2.15	2.23	2.39	2.90	3.43	
	20	1.99	2.00	2.15	2.24	2.34	2.45	2.67	2.78	3.02	3.75	4.52	
	30	2.20	2.24	2.45	2.57	2.70	2.84	3.12	3.27	3.57	4.51	5.48	
	40	2.39	2.45	2.72	2.87	3.03	3.20	3.54	3.72	4.08	5.21	6.38	
	60	2.70	2.83	3.21	3.42	3.64	3.86	4.32	4.56	5.03	6.49	8.02	
	70	2.85	3.00	3.44	3.68	3.93	4.18	4.69	4.95	5.47	7.10	8.78	
	80	2.98	3.17	3.67	3.93	4.20	4.48	5.04	5.33	5.90	7.68	9.53	
50	5	1.75	1.72	1.78	1.83	1.89	1.95	2.07	2.13	2.26	2.65	3.04	
	10	2.01	1.99	2.08	2.14	2.21	2.29	2.44	2.52	2.68	3.17	3.68	
	20	2.36	2.36	2.50	2.59	2.68	2.78	2.99	3.10	3.32	4.01	4.75	
	30	2.63	2.65	2.83	2.94	3.06	3.19	3.45	3.59	3.87	4.75	5.70	
	40	2.85	2.89	3.12	3.25	3.40	3.55	3.87	4.03	4.37	5.44	6.58	
	60	3.22	3.31	3.62	3.81	4.00	4.20	4.63	4.84	5.29	6.71	8.20	
	70	3.39	3.49	3.86	4.06	4.28	4.51	4.98	5.23	5.73	7.30	8.96	
	80	3.54	3.67	4.08	4.31	4.55	4.81	5.33	5.60	6.15	7.88	9.69	
100	5	1.98	1.95	2.02	2.07	2.13	2.20	2.33	2.39	2.53	2.93	3.34	
	10	2.31	2.28	2.38	2.45	2.52	2.60	2.76	2.84	3.01	3.51	4.03	
	20	2.75	2.74	2.88	2.97	3.07	3.17	3.38	3.49	3.71	4.39	5.11	
	30	3.07	3.08	3.26	3.37	3.49	3.61	3.87	4.01	4.28	5.13	6.04	
	40	3.34	3.37	3.58	3.71	3.86	4.00	4.31	4.46	4.79	5.81	6.90	
	60	3.79	3.85	4.14	4.31	4.49	4.68	5.08	5.28	5.70	7.05	8.50	
	70	3.98	4.06	4.39	4.58	4.78	4.99	5.43	5.66	6.13	7.64	9.25	
	80	4.16	4.26	4.62	4.83	5.06	5.29	5.78	6.03	6.55	8.20	9.97	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.0 m (RADIUS = 9.2 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	TEMPERATURE RISE °C	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150	5	2.15	2.11	2.19	2.25	2.31	2.38	2.51	2.58	2.72	3.15	3.56	
	10	2.52	2.50	2.60	2.67	2.75	2.83	2.99	3.08	3.25	3.77	4.30	
	20	3.02	3.01	3.16	3.25	3.35	3.46	3.67	3.78	4.01	4.70	5.41	
	30	3.39	3.40	3.58	3.69	3.81	3.94	4.20	4.34	4.61	5.46	6.35	
	40	3.70	3.72	3.93	4.07	4.21	4.35	4.66	4.82	5.14	6.14	7.21	
	60	4.20	4.25	4.53	4.70	4.88	5.07	5.46	5.66	6.07	7.38	8.79	
	70	4.41	4.48	4.80	4.99	5.19	5.39	5.82	6.04	6.50	7.96	9.53	
	80	4.61	4.70	5.05	5.26	5.47	5.70	6.17	6.41	6.92	8.52	10.25	
200	5	2.28	2.25	2.33	2.39	2.45	2.52	2.66	2.74	2.88	3.32	3.75	
	10	2.70	2.67	2.78	2.85	2.93	3.01	3.19	3.28	3.45	3.99	4.53	
	20	3.25	3.24	3.38	3.48	3.58	3.69	3.92	4.03	4.26	4.97	5.68	
	30	3.65	3.66	3.84	3.96	4.08	4.21	4.48	4.61	4.89	5.75	6.64	
	40	3.99	4.00	4.22	4.36	4.50	4.65	4.96	5.12	5.44	6.44	7.50	
	60	4.53	4.58	4.86	5.03	5.21	5.40	5.79	5.99	6.40	7.69	9.07	
	70	4.77	4.83	5.14	5.33	5.53	5.74	6.16	6.38	6.83	8.27	9.81	
	80	4.99	5.06	5.41	5.61	5.83	6.05	6.52	6.76	7.25	8.82	10.52	
250	5	2.40	2.36	2.44	2.51	2.57	2.65	2.79	2.87	3.02	3.47	3.91	
	10	2.85	2.82	2.93	3.00	3.09	3.17	3.35	3.44	3.63	4.18	4.73	
	20	3.44	3.43	3.58	3.68	3.79	3.90	4.13	4.24	4.48	5.20	5.93	
	30	3.88	3.88	4.06	4.18	4.31	4.44	4.72	4.86	5.14	6.01	6.90	
	40	4.23	4.25	4.47	4.61	4.75	4.91	5.22	5.38	5.71	6.72	7.77	
	60	4.82	4.86	5.14	5.32	5.50	5.69	6.08	6.28	6.69	7.97	9.34	
	70	5.07	5.13	5.44	5.63	5.83	6.04	6.46	6.68	7.13	8.56	10.07	
	80	5.30	5.37	5.72	5.92	6.14	6.36	6.83	7.07	7.56	9.11	10.78	
300	5	2.50	2.46	2.55	2.61	2.68	2.76	2.91	2.98	3.14	3.60	4.05	
	10	2.98	2.95	3.06	3.14	3.23	3.32	3.50	3.59	3.78	4.35	4.91	
	20	3.61	3.60	3.75	3.85	3.96	4.08	4.31	4.43	4.67	5.40	6.14	
	30	4.08	4.07	4.26	4.39	4.52	4.65	4.93	5.07	5.36	6.24	7.14	
	40	4.45	4.47	4.69	4.83	4.98	5.13	5.45	5.62	5.95	6.96	8.02	
	60	5.07	5.11	5.40	5.57	5.76	5.95	6.34	6.54	6.96	8.24	9.60	
	70	5.34	5.39	5.71	5.90	6.10	6.31	6.74	6.96	7.41	8.83	10.33	
	80	5.59	5.65	5.99	6.20	6.42	6.65	7.11	7.35	7.84	9.39	11.04	
400	5	2.68	2.64	2.73	2.80	2.87	2.95	3.10	3.18	3.35	3.83	4.30	
	10	3.21	3.18	3.29	3.38	3.47	3.56	3.75	3.85	4.05	4.64	5.22	
	20	3.91	3.89	4.05	4.16	4.27	4.39	4.64	4.76	5.01	5.77	6.53	
	30	4.42	4.41	4.61	4.74	4.87	5.01	5.30	5.45	5.75	6.65	7.57	
	40	4.83	4.84	5.07	5.22	5.37	5.53	5.86	6.03	6.37	7.41	8.47	
	60	5.51	5.55	5.84	6.02	6.21	6.40	6.80	7.01	7.43	8.73	10.08	
	70	5.81	5.85	6.17	6.37	6.57	6.78	7.22	7.45	7.90	9.32	10.82	
	80	6.07	6.13	6.48	6.69	6.91	7.14	7.61	7.86	8.35	9.89	11.53	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.0 m (RADIUS = 9.2 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m										
(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
0	5	1.59	1.63	1.81	1.91	2.02	2.13	2.35	2.46	2.68	3.37	4.06
	10	1.84	1.94	2.23	2.38	2.53	2.68	2.99	3.15	3.46	4.42	5.39
	20	2.26	2.47	2.93	3.16	3.39	3.62	4.08	4.31	4.77	6.18	7.63
	30	2.62	2.94	3.55	3.85	4.14	4.44	5.03	5.33	5.92	7.73	9.60
	40	2.96	3.37	4.11	4.48	4.83	5.19	5.90	6.26	6.97	9.16	11.40
	60	3.58	4.15	5.15	5.63	6.10	6.57	7.50	7.97	8.90	11.76	14.71
	70	3.87	4.51	5.64	6.17	6.69	7.21	8.25	8.77	9.81	12.98	16.25
	80	4.15	4.86	6.10	6.69	7.26	7.83	8.97	9.54	10.68	14.16	17.74
10	5	1.97	1.96	2.08	2.16	2.25	2.34	2.54	2.64	2.85	3.50	4.17
	10	2.25	2.28	2.48	2.60	2.73	2.87	3.16	3.30	3.60	4.53	5.49
	20	2.67	2.78	3.15	3.35	3.56	3.78	4.22	4.44	4.89	6.28	7.71
	30	3.03	3.22	3.74	4.02	4.30	4.58	5.15	5.44	6.03	7.82	9.67
	40	3.35	3.63	4.30	4.64	4.98	5.32	6.02	6.37	7.07	9.24	11.47
	60	3.94	4.39	5.32	5.78	6.23	6.69	7.61	8.07	8.99	11.83	14.77
	70	4.22	4.75	5.80	6.31	6.82	7.33	8.35	8.86	9.89	13.05	16.31
	80	4.49	5.09	6.26	6.83	7.39	7.95	9.07	9.63	10.76	14.22	17.80
20	5	2.16	2.14	2.25	2.33	2.42	2.51	2.70	2.80	3.00	3.63	4.28
	10	2.49	2.50	2.67	2.79	2.91	3.04	3.31	3.45	3.74	4.64	5.58
	20	2.96	3.03	3.35	3.53	3.73	3.93	4.35	4.57	5.01	6.37	7.79
	30	3.33	3.48	3.93	4.19	4.45	4.72	5.28	5.56	6.13	7.90	9.74
	40	3.67	3.88	4.48	4.80	5.13	5.46	6.13	6.48	7.17	9.32	11.54
	60	4.26	4.63	5.48	5.92	6.36	6.81	7.71	8.17	9.08	11.91	14.83
	70	4.54	4.98	5.95	6.45	6.95	7.45	8.45	8.96	9.98	13.12	16.37
	80	4.80	5.32	6.41	6.96	7.51	8.06	9.17	9.72	10.84	14.29	17.85
50	5	2.51	2.48	2.59	2.67	2.76	2.85	3.04	3.14	3.34	3.95	4.59
	10	2.93	2.92	3.09	3.20	3.32	3.44	3.70	3.83	4.10	4.95	5.86
	20	3.51	3.55	3.82	3.99	4.17	4.35	4.74	4.94	5.35	6.65	8.03
	30	3.95	4.05	4.43	4.65	4.89	5.13	5.64	5.90	6.45	8.16	9.96
	40	4.33	4.48	4.97	5.25	5.54	5.85	6.48	6.80	7.47	9.55	11.74
	60	4.99	5.24	5.95	6.35	6.75	7.17	8.02	8.46	9.35	12.12	15.01
	70	5.28	5.59	6.42	6.86	7.32	7.79	8.75	9.24	10.24	13.32	16.54
	80	5.56	5.93	6.86	7.36	7.87	8.39	9.46	10.00	11.09	14.49	18.02
100	5	2.86	2.83	2.95	3.03	3.12	3.22	3.42	3.52	3.73	4.36	5.00
	10	3.38	3.37	3.54	3.65	3.77	3.90	4.16	4.29	4.56	5.40	6.28
	20	4.09	4.12	4.38	4.54	4.71	4.89	5.26	5.45	5.84	7.09	8.41
	30	4.62	4.69	5.04	5.25	5.47	5.70	6.18	6.43	6.94	8.57	10.31
	40	5.07	5.18	5.61	5.87	6.14	6.42	7.01	7.31	7.94	9.94	12.07
	60	5.82	6.01	6.63	6.98	7.35	7.73	8.53	8.94	9.79	12.47	15.31
	70	6.15	6.39	7.10	7.49	7.91	8.34	9.24	9.71	10.66	13.66	16.83
	80	6.46	6.74	7.54	7.99	8.45	8.94	9.93	10.45	11.50	14.82	18.30

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.0 m (RADIUS = 9.2 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE
TIME INDEX

CEILING HEIGHT, m

(m*s)^{1/2}

TEMPERATURE
RISE

°C

	1	2	4	5	6	7	9	10	12	18	24
150	3.12	3.09	3.21	3.30	3.39	3.49	3.70	3.81	4.02	4.67	5.32
	3.72	3.70	3.87	3.99	4.11	4.24	4.51	4.64	4.92	5.77	6.65
	4.52	4.54	4.79	4.96	5.13	5.31	5.68	5.87	6.26	7.49	8.78
	5.11	5.17	5.51	5.72	5.93	6.16	6.63	6.87	7.37	8.96	10.66
	5.61	5.70	6.12	6.37	6.63	6.91	7.48	7.77	8.38	10.31	12.39
	6.44	6.60	7.18	7.52	7.87	8.24	9.00	9.39	10.21	12.82	15.61
	6.80	7.00	7.67	8.04	8.44	8.85	9.71	10.15	11.07	14.00	17.12
	7.13	7.38	8.12	8.54	8.98	9.44	10.39	10.89	11.91	15.14	18.58
200	3.33	3.29	3.42	3.51	3.61	3.71	3.93	4.04	4.26	4.93	5.59
	3.98	3.97	4.14	4.26	4.39	4.52	4.80	4.94	5.22	6.09	6.97
	4.86	4.88	5.14	5.30	5.48	5.66	6.03	6.23	6.62	7.84	9.13
	5.51	5.56	5.90	6.11	6.32	6.55	7.02	7.26	7.76	9.32	10.99
	6.05	6.13	6.55	6.79	7.06	7.33	7.89	8.18	8.78	10.67	12.72
	6.94	7.09	7.66	7.99	8.33	8.69	9.43	9.82	10.61	13.16	15.90
	7.33	7.51	8.16	8.52	8.91	9.31	10.14	10.58	11.47	14.33	17.41
	7.69	7.91	8.63	9.03	9.46	9.90	10.83	11.31	12.30	15.47	18.86
250	3.51	3.47	3.60	3.69	3.80	3.90	4.13	4.24	4.47	5.15	5.83
	4.21	4.19	4.37	4.50	4.63	4.76	5.04	5.19	5.48	6.36	7.25
	5.16	5.17	5.43	5.60	5.78	5.96	6.34	6.54	6.94	8.17	9.45
	5.85	5.90	6.24	6.45	6.67	6.89	7.37	7.61	8.11	9.66	11.32
	6.43	6.50	6.92	7.17	7.43	7.70	8.26	8.55	9.14	11.02	13.03
	7.38	7.52	8.07	8.40	8.74	9.09	9.83	10.21	10.99	13.50	16.20
	7.79	7.96	8.59	8.95	9.33	9.73	10.55	10.97	11.85	14.66	17.69
	8.17	8.38	9.08	9.48	9.89	10.33	11.24	11.71	12.67	15.79	19.14
300	3.66	3.63	3.76	3.86	3.96	4.07	4.30	4.42	4.65	5.35	6.04
	4.42	4.39	4.58	4.70	4.84	4.98	5.27	5.41	5.71	6.61	7.51
	5.42	5.43	5.69	5.87	6.05	6.23	6.62	6.82	7.22	8.46	9.74
	6.16	6.19	6.54	6.75	6.97	7.20	7.68	7.93	8.42	9.98	11.62
	6.76	6.83	7.25	7.50	7.76	8.03	8.60	8.89	9.48	11.34	13.34
	7.77	7.90	8.45	8.77	9.11	9.46	10.19	10.57	11.35	13.82	16.49
	8.20	8.36	8.98	9.34	9.72	10.11	10.92	11.34	12.21	14.98	17.97
	8.60	8.79	9.48	9.88	10.29	10.72	11.62	12.08	13.03	16.10	19.41
400	3.93	3.89	4.04	4.14	4.25	4.36	4.60	4.72	4.97	5.69	6.41
	4.77	4.74	4.93	5.07	5.21	5.35	5.65	5.80	6.11	7.04	7.97
	5.87	5.87	6.15	6.33	6.51	6.71	7.11	7.31	7.72	8.99	10.28
	6.68	6.71	7.06	7.28	7.51	7.74	8.23	8.48	8.99	10.56	12.19
	7.34	7.40	7.82	8.08	8.34	8.62	9.19	9.49	10.08	11.95	13.91
	8.44	8.55	9.10	9.43	9.77	10.12	10.85	11.23	12.00	14.44	17.05
	8.91	9.05	9.67	10.03	10.40	10.79	11.60	12.02	12.87	15.59	18.53
	9.34	9.52	10.19	10.59	11.00	11.43	12.31	12.77	13.71	16.71	19.95

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.0 m (RADIUS = 9.2 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE	CEILING HEIGHT, m														
			1	2	4	5	6	7	9	10	12	18	24				
0 (m*s) ^{1/2}	°C																
	5	2.34	2.46	2.81	2.99	3.18	3.36	3.74	3.93	4.32	5.49	6.69					
	10	2.84	3.09	3.64	3.92	4.20	4.47	5.03	5.31	5.88	7.59	9.35					
	20	3.68	4.15	5.05	5.48	5.91	6.34	7.20	7.63	8.49	11.13	13.83					
	30	4.42	5.08	6.28	6.85	7.42	7.98	9.10	9.66	10.79	14.23	17.76					
	40	5.09	5.94	7.41	8.11	8.80	9.49	10.85	11.53	12.90	17.07	21.37					
	60	6.33	7.50	9.49	10.42	11.34	12.24	14.05	14.95	16.76	22.28	27.98					
	80	7.47	8.94	11.39	12.54	13.66	14.77	16.98	18.09	20.30	27.07	34.07					
10	5	2.84	2.86	3.10	3.25	3.42	3.59	3.94	4.12	4.49	5.62	6.80					
	10	3.34	3.46	3.90	4.15	4.40	4.66	5.20	5.47	6.02	7.70	9.45					
	20	4.14	4.47	5.27	5.68	6.09	6.50	7.34	7.76	8.61	11.22	13.91					
	30	4.84	5.37	6.48	7.03	7.58	8.13	9.23	9.78	10.90	14.31	17.83					
	40	5.49	6.21	7.60	8.28	8.95	9.62	10.97	11.64	13.00	17.15	21.44					
	60	6.70	7.75	9.66	10.57	11.47	12.37	14.15	15.05	16.85	22.35	28.04					
	70	7.26	8.47	10.62	11.64	12.65	13.65	15.64	16.64	18.65	24.79	31.13					
	80	7.81	9.17	11.55	12.68	13.79	14.89	17.08	18.18	20.39	27.13	34.10					
20	5	3.12	3.12	3.34	3.48	3.63	3.79	4.12	4.29	4.65	5.75	6.91					
	10	3.68	3.76	4.14	4.36	4.60	4.85	5.36	5.62	6.16	7.82	9.54					
	20	4.52	4.77	5.48	5.87	6.26	6.66	7.48	7.89	8.73	11.32	13.99					
	30	5.22	5.66	6.68	7.20	7.73	8.27	9.35	9.90	11.00	14.40	17.91					
	40	5.87	6.48	7.78	8.44	9.10	9.76	11.08	11.75	13.10	17.23	21.51					
	60	7.05	7.99	9.82	10.71	11.60	12.49	14.26	15.15	16.94	22.43	28.10					
	70	7.60	8.70	10.78	11.78	12.78	13.77	15.74	16.74	18.74	24.86	31.18					
	80	8.14	9.39	11.70	12.81	13.91	15.00	17.18	18.27	20.47	27.20	34.16					
50	5	3.64	3.63	3.83	3.96	4.11	4.26	4.58	4.74	5.08	6.13	7.24					
	10	4.33	4.37	4.70	4.91	5.12	5.34	5.81	6.06	6.56	8.14	9.82					
	20	5.31	5.48	6.07	6.40	6.76	7.12	7.88	8.28	9.08	11.59	14.23					
	30	6.09	6.39	7.24	7.71	8.20	8.70	9.72	10.25	11.32	14.65	18.12					
	40	6.77	7.21	8.32	8.92	9.53	10.15	11.43	12.08	13.39	17.47	21.71					
	60	7.98	8.69	10.31	11.15	12.00	12.85	14.57	15.44	17.21	22.64	28.28					
	70	8.53	9.39	11.25	12.20	13.16	14.11	16.05	17.02	18.99	25.06	31.36					
	80	9.06	10.06	12.16	13.22	14.28	15.34	17.47	18.55	20.72	27.40	34.33					
100	5	4.18	4.16	4.36	4.50	4.65	4.81	5.13	5.29	5.63	6.66	7.74					
	10	5.02	5.05	5.36	5.56	5.77	5.98	6.44	6.67	7.15	8.67	10.28					
	20	6.19	6.31	6.83	7.14	7.47	7.81	8.52	8.88	9.64	12.05	14.62					
	30	7.08	7.30	8.04	8.46	8.91	9.37	10.32	10.82	11.84	15.07	18.48					
	40	7.84	8.17	9.12	9.66	10.22	10.80	12.00	12.62	13.88	17.86	22.04					
	60	9.15	9.70	11.09	11.85	12.64	13.44	15.09	15.94	17.65	22.99	28.59					
	70	9.73	10.40	12.02	12.89	13.78	14.69	16.55	17.50	19.42	25.40	31.65					
	80	10.29	11.07	12.91	13.89	14.88	15.90	17.96	19.01	21.14	27.73	34.61					

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.0 m (RADIUS = 9.2 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	°C	1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}													
150	5	4.58	4.55	4.76	4.90	5.05	5.21	5.54	5.71	6.05	6.05	7.10	8.18
	10	5.53	5.55	5.86	6.06	6.27	6.48	6.94	7.17	7.65	7.65	9.14	10.72
	20	6.83	6.93	7.44	7.74	8.06	8.39	9.07	9.43	10.16	10.16	12.50	15.01
	30	7.81	8.00	8.70	9.10	9.53	9.97	10.89	11.36	12.34	12.34	15.48	18.84
	40	8.64	8.92	9.82	10.32	10.85	11.40	12.54	13.14	14.36	14.36	18.25	22.37
	60	10.05	10.52	11.81	12.52	13.26	14.02	15.60	16.42	18.09	18.09	23.35	28.89
	70	10.68	11.25	12.73	13.54	14.38	15.25	17.04	17.97	19.85	19.85	25.74	31.94
	80	11.27	11.93	13.62	14.53	15.47	16.44	18.44	19.46	21.55	21.55	28.06	34.89
200	5	4.90	4.87	5.08	5.23	5.38	5.55	5.89	6.06	6.41	6.41	7.47	8.56
	10	5.94	5.95	6.26	6.47	6.68	6.90	7.36	7.59	8.07	8.07	9.56	11.13
	20	7.35	7.44	7.94	8.24	8.56	8.88	9.56	9.92	10.64	10.64	12.93	15.40
	30	8.41	8.59	9.26	9.66	10.07	10.50	11.40	11.86	12.82	12.82	15.89	19.19
	40	9.31	9.56	10.42	10.90	11.42	11.95	13.06	13.64	14.83	14.83	18.63	22.70
	60	10.81	11.23	12.45	13.12	13.83	14.57	16.10	16.89	18.53	18.53	23.70	29.19
	70	11.47	11.98	13.38	14.15	14.96	15.79	17.53	18.43	20.27	20.27	26.08	32.23
	80	12.09	12.69	14.27	15.14	16.04	16.98	18.91	19.91	21.96	21.96	28.39	35.17
250	5	5.17	5.14	5.36	5.51	5.67	5.84	6.18	6.36	6.72	6.72	7.80	8.90
	10	6.29	6.30	6.62	6.82	7.04	7.26	7.73	7.97	8.45	8.45	9.95	11.51
	20	7.80	7.88	8.38	8.68	9.00	9.33	10.01	10.36	11.07	11.07	13.34	15.77
	30	8.93	9.09	9.76	10.15	10.56	10.98	11.87	12.33	13.27	13.27	16.29	19.54
	40	9.88	10.11	10.95	11.43	11.93	12.45	13.54	14.11	15.27	15.27	19.01	23.03
	60	11.46	11.85	13.03	13.68	14.37	15.09	16.58	17.36	18.95	18.95	24.05	29.49
	70	12.15	12.63	13.97	14.72	15.50	16.31	18.00	18.88	20.68	20.68	26.42	32.52
	80	12.80	13.36	14.87	15.71	16.59	17.49	19.38	20.36	22.36	22.36	28.72	35.45
300	5	5.41	5.38	5.60	5.75	5.92	6.09	6.45	6.63	6.99	6.99	8.10	9.21
	10	6.60	6.60	6.93	7.14	7.36	7.59	8.06	8.30	8.79	8.79	10.30	11.86
	20	8.20	8.28	8.77	9.08	9.39	9.72	10.41	10.76	11.47	11.47	13.73	16.13
	30	9.39	9.54	10.20	10.59	11.00	11.43	12.31	12.76	13.69	13.69	16.67	19.88
	40	10.39	10.61	11.43	11.91	12.40	12.92	14.00	14.55	15.70	15.70	19.38	23.36
	60	12.04	12.41	13.56	14.20	14.88	15.58	17.04	17.80	19.37	19.37	24.40	29.79
	70	12.76	13.21	14.52	15.25	16.01	16.81	18.46	19.32	21.09	21.09	26.76	32.81
	80	13.44	13.96	15.43	16.25	17.10	17.99	19.83	20.79	22.76	22.76	29.04	35.73
400	5	5.83	5.79	6.02	6.18	6.36	6.53	6.90	7.09	7.47	7.47	8.61	9.75
	10	7.14	7.14	7.47	7.68	7.91	8.15	8.64	8.88	9.39	9.39	10.93	12.50
	20	8.89	8.96	9.46	9.77	10.09	10.42	11.11	11.47	12.19	12.19	14.44	16.82
	30	10.19	10.32	10.98	11.37	11.78	12.21	13.09	13.54	14.47	14.47	17.40	20.55
	40	11.27	11.47	12.28	12.75	13.25	13.76	14.82	15.37	16.50	16.50	20.11	24.00
	60	13.05	13.39	14.50	15.13	15.80	16.48	17.91	18.65	20.17	20.17	25.08	30.38
	70	13.83	14.24	15.50	16.21	16.95	17.72	19.33	20.17	21.89	21.89	27.42	33.38
	80	14.55	15.03	16.44	17.23	18.06	18.91	20.70	21.63	23.55	23.55	29.69	36.29

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.0 m (RADIUS = 9.2 m)₃
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	5	3.59	3.88	4.54	4.87	5.21	5.55	6.23	6.57	7.25	9.34	11.48	
	10	4.59	5.14	6.21	6.73	7.25	7.77	8.81	9.32	10.37	13.55	16.81	
	20	6.27	7.26	9.02	9.86	10.69	11.51	13.14	13.96	15.60	20.62	25.78	
	30	7.74	9.12	11.49	12.60	13.70	14.79	16.95	18.03	20.19	26.81	33.63	
	40	9.09	10.83	13.75	15.12	16.47	17.80	20.44	21.76	24.41	32.50	40.85	
	60	11.57	13.95	17.90	19.74	21.53	23.31	26.83	28.60	32.13	42.93	54.07	
	70	12.73	15.41	19.84	21.89	23.90	25.88	29.82	31.79	35.74	47.80	60.25	
	80	13.85	16.82	21.71	23.97	26.18	28.37	32.71	34.87	39.22	52.50	66.21	
10	5	4.18	4.32	4.84	5.14	5.45	5.77	6.42	6.75	7.42	9.48	11.59	
	10	5.13	5.52	6.47	6.96	7.46	7.96	8.97	9.48	10.51	13.66	16.91	
	20	6.74	7.58	9.24	10.05	10.86	11.67	13.28	14.09	15.72	20.71	25.86	
	30	8.17	9.41	11.69	12.78	13.86	14.93	17.07	18.14	20.30	26.90	33.71	
	40	9.50	11.10	13.94	15.29	16.61	17.93	20.56	21.87	24.51	32.58	40.92	
	60	11.94	14.20	18.07	19.88	21.66	23.43	26.94	28.70	32.22	43.00	54.13	
	70	13.08	15.65	20.00	22.03	24.03	26.00	29.92	31.89	35.83	47.87	60.30	
	80	14.19	17.06	21.87	24.11	26.31	28.48	32.81	34.97	39.31	52.56	66.26	
20	5	4.58	4.67	5.13	5.40	5.69	5.99	6.61	6.93	7.59	9.61	11.71	
	10	5.58	5.88	6.72	7.19	7.66	8.15	9.13	9.63	10.65	13.77	17.00	
	20	7.19	7.90	9.46	10.25	11.04	11.83	13.42	14.22	15.84	20.80	25.94	
	30	8.59	9.70	11.88	12.95	14.02	15.07	17.20	18.26	20.41	26.98	33.78	
	40	9.89	11.37	14.12	15.45	16.76	18.06	20.67	21.98	24.61	32.66	40.99	
	60	12.30	14.45	18.24	20.03	21.80	23.55	27.05	28.79	32.31	43.07	54.19	
	70	13.43	15.89	20.16	22.18	24.16	26.12	30.03	31.98	35.91	47.93	60.36	
	80	14.52	17.28	22.02	24.25	26.43	28.60	32.90	35.06	39.39	52.63	66.32	
50	5	5.36	5.40	5.80	6.05	6.31	6.58	7.16	7.45	8.06	10.00	12.04	
	10	6.53	6.72	7.42	7.83	8.25	8.70	9.62	10.09	11.06	14.10	17.29	
	20	8.26	8.77	10.10	10.81	11.55	12.30	13.83	14.61	16.19	21.08	26.18	
	30	9.69	10.54	12.47	13.47	14.48	15.51	17.57	18.62	20.73	27.24	34.00	
	40	10.98	12.16	14.67	15.93	17.20	18.47	21.02	22.31	24.91	32.90	41.19	
	60	13.34	15.17	18.73	20.47	22.19	23.92	27.36	29.09	32.58	43.28	54.37	
	70	14.44	16.59	20.64	22.60	24.54	26.47	30.33	32.27	36.17	48.14	60.54	
	80	15.51	17.96	22.49	24.66	26.80	28.94	33.20	35.34	39.64	52.83	66.49	
100	5	6.18	6.21	6.58	6.82	7.08	7.34	7.90	8.18	8.77	10.62	12.59	
	10	7.57	7.70	8.33	8.71	9.10	9.51	10.37	10.81	11.73	14.65	17.75	
	20	9.53	9.91	11.06	11.70	12.37	13.07	14.51	15.25	16.77	21.55	26.57	
	30	11.09	11.73	13.40	14.31	15.25	16.21	18.19	19.20	21.26	27.66	34.36	
	40	12.45	13.36	15.56	16.72	17.92	19.13	21.60	22.85	25.40	33.29	41.52	
	60	14.86	16.33	19.55	21.19	22.85	24.52	27.89	29.59	33.03	43.64	54.68	
	70	15.96	17.72	21.43	23.30	25.17	27.05	30.84	32.75	36.60	48.48	60.83	
	80	17.03	19.07	23.25	25.33	27.41	29.50	33.69	35.80	40.06	53.16	66.77	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.0 m (RADIUS = 9.2 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 150	°C												
	5	6.79	6.79	7.17	7.41	7.67	7.94	8.49	8.78	9.36	11.18	13.11	
	10	8.33	8.44	9.05	9.41	9.80	10.20	11.03	11.46	12.35	15.18	18.22	
	20	10.49	10.81	11.88	12.48	13.12	13.78	15.16	15.87	17.34	22.01	26.97	
	30	12.16	12.71	14.25	15.10	15.98	16.90	18.80	19.78	21.78	28.08	34.71	
	40	13.61	14.39	16.40	17.49	18.62	19.78	22.17	23.39	25.89	33.69	41.86	
	60	16.12	17.39	20.35	21.91	23.50	25.11	28.41	30.08	33.47	44.00	54.98	
	70	17.25	18.78	22.21	23.99	25.80	27.63	31.34	33.22	37.03	48.83	61.12	
200	80	18.34	20.12	24.01	26.00	28.02	30.06	34.18	36.26	40.47	53.49	67.00	
	5	7.27	7.28	7.66	7.90	8.16	8.43	8.99	9.28	9.87	11.69	13.59	
	10	8.95	9.05	9.65	10.01	10.39	10.79	11.62	12.04	12.92	15.69	18.67	
	20	11.28	11.57	12.59	13.18	13.80	14.44	15.77	16.47	17.90	22.47	27.36	
	30	13.06	13.56	15.01	15.82	16.67	17.55	19.39	20.34	22.30	28.50	35.07	
	40	14.58	15.29	17.17	18.21	19.30	20.42	22.74	23.93	26.38	34.08	42.19	
	60	17.20	18.34	21.11	22.60	24.14	25.71	28.93	30.57	33.92	44.35	55.28	
	70	18.37	19.75	22.96	24.67	26.42	28.20	31.84	33.69	37.46	49.17	61.41	
250	80	19.49	21.09	24.75	26.67	28.62	30.61	34.66	36.72	40.89	53.82	67.34	
	5	7.69	7.69	8.07	8.32	8.59	8.86	9.43	9.72	10.31	12.15	14.05	
	10	9.49	9.58	10.17	10.54	10.92	11.32	12.14	12.56	13.43	16.18	19.12	
	20	11.96	12.23	13.23	13.80	14.41	15.04	16.35	17.03	18.43	22.92	27.75	
	30	13.84	14.29	15.70	16.49	17.31	18.17	19.96	20.89	22.80	28.91	35.43	
	40	15.43	16.08	17.89	18.90	19.94	21.03	23.29	24.46	26.86	34.46	42.52	
	60	18.15	19.21	21.84	23.28	24.76	26.29	29.44	31.06	34.36	44.70	55.58	
	70	19.36	20.63	23.69	25.33	27.03	28.76	32.34	34.16	37.89	49.51	61.70	
300	80	20.51	21.99	25.46	27.32	29.22	31.16	35.14	37.17	41.30	54.15	67.62	
	5	8.06	8.05	8.44	8.70	8.97	9.25	9.82	10.12	10.72	12.56	14.47	
	10	9.96	10.04	10.64	11.00	11.39	11.79	12.62	13.04	13.91	16.64	19.55	
	20	12.56	12.81	13.80	14.37	14.97	15.59	16.89	17.56	18.94	23.37	28.14	
	30	14.53	14.96	16.33	17.10	17.91	18.75	20.51	21.42	23.30	29.33	35.78	
	40	16.19	16.80	18.56	19.53	20.56	21.62	23.83	24.97	27.33	34.85	42.86	
	60	19.01	20.00	22.54	23.93	25.37	26.86	29.95	31.54	34.80	45.06	55.88	
	70	20.26	21.44	24.38	25.97	27.62	29.32	32.83	34.63	38.31	49.85	62.00	
400	80	21.44	22.82	26.16	27.95	29.81	31.71	35.62	37.62	41.71	54.48	67.90	
	5	8.70	8.69	9.09	9.35	9.63	9.92	10.51	10.81	11.43	13.31	15.23	
	10	10.78	10.85	11.45	11.82	12.22	12.62	13.46	13.89	14.76	17.49	20.37	
	20	13.61	13.84	14.81	15.38	15.97	16.59	17.87	18.53	19.89	24.23	28.90	
	30	15.73	16.12	17.45	18.21	19.00	19.83	21.54	22.43	24.26	30.14	36.49	
	40	17.52	18.07	19.76	20.70	21.69	22.72	24.86	25.97	28.27	35.62	43.52	
	60	20.52	21.41	23.82	25.14	26.53	27.96	30.94	32.49	35.66	45.76	56.49	
	70	21.84	22.91	25.68	27.20	28.78	30.41	33.80	35.55	39.15	50.53	62.57	
80	23.07	24.33	27.46	29.17	30.95	32.78	36.57	38.52	42.53	55.14	68.46		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.5 m (RADIUS = 9.5 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	5	1.15	1.15	1.25	1.31	1.37	1.44	1.57	1.64	1.77	2.19	2.60	
	10	1.28	1.31	1.46	1.55	1.63	1.72	1.90	1.99	2.17	2.72	3.28	
	20	1.49	1.59	1.83	1.95	2.07	2.20	2.45	2.58	2.84	3.62	4.42	
	30	1.68	1.83	2.14	2.30	2.46	2.62	2.94	3.10	3.42	4.41	5.41	
	40	1.86	2.05	2.43	2.63	2.82	3.01	3.39	3.58	3.96	5.13	6.33	
	60	2.18	2.45	2.97	3.22	3.47	3.71	4.21	4.45	4.95	6.46	8.01	
	70	2.33	2.64	3.22	3.50	3.77	4.04	4.59	4.86	5.41	7.08	8.79	
	80	2.47	2.82	3.46	3.76	4.06	4.36	4.96	5.26	5.85	7.68	9.55	
10	5	1.44	1.41	1.47	1.52	1.57	1.63	1.75	1.81	1.93	2.32	2.72	
	10	1.61	1.60	1.69	1.76	1.83	1.90	2.06	2.14	2.31	2.83	3.38	
	20	1.85	1.87	2.04	2.14	2.25	2.36	2.59	2.71	2.96	3.71	4.50	
	30	2.05	2.10	2.34	2.48	2.62	2.77	3.07	3.22	3.53	4.49	5.49	
	40	2.22	2.31	2.62	2.79	2.96	3.14	3.51	3.69	4.06	5.21	6.40	
	60	2.52	2.70	3.14	3.37	3.60	3.84	4.31	4.55	5.04	6.53	8.07	
	70	2.67	2.88	3.38	3.64	3.90	4.16	4.69	4.96	5.50	7.15	8.85	
	80	2.80	3.05	3.62	3.90	4.19	4.48	5.06	5.35	5.94	7.74	9.60	
20	5	1.57	1.54	1.60	1.64	1.70	1.75	1.87	1.93	2.05	2.43	2.82	
	10	1.77	1.75	1.84	1.90	1.97	2.04	2.20	2.27	2.44	2.94	3.47	
	20	2.05	2.06	2.21	2.30	2.40	2.51	2.73	2.84	3.07	3.81	4.58	
	30	2.27	2.31	2.51	2.64	2.77	2.90	3.19	3.34	3.64	4.58	5.56	
	40	2.46	2.53	2.79	2.94	3.11	3.27	3.62	3.80	4.16	5.29	6.47	
	60	2.79	2.91	3.30	3.51	3.73	3.96	4.42	4.65	5.13	6.60	8.13	
	70	2.94	3.09	3.54	3.78	4.03	4.28	4.79	5.06	5.58	7.22	8.91	
	80	3.08	3.27	3.77	4.04	4.31	4.59	5.16	5.44	6.02	7.81	9.66	
50	5	1.80	1.77	1.83	1.88	1.93	1.99	2.11	2.18	2.30	2.69	3.08	
	10	2.07	2.04	2.13	2.20	2.26	2.34	2.49	2.57	2.73	3.22	3.73	
	20	2.43	2.43	2.56	2.65	2.75	2.85	3.05	3.16	3.38	4.08	4.81	
	30	2.71	2.72	2.90	3.01	3.13	3.26	3.52	3.66	3.94	4.83	5.78	
	40	2.94	2.97	3.20	3.33	3.48	3.63	3.95	4.11	4.45	5.53	6.67	
	60	3.32	3.40	3.72	3.90	4.10	4.30	4.73	4.95	5.40	6.82	8.31	
	70	3.49	3.60	3.96	4.17	4.39	4.62	5.09	5.34	5.84	7.42	9.08	
	80	3.65	3.78	4.19	4.42	4.67	4.92	5.45	5.72	6.27	8.01	9.83	
100	5	2.04	2.00	2.07	2.12	2.18	2.24	2.37	2.44	2.57	2.98	3.38	
	10	2.38	2.35	2.44	2.51	2.58	2.66	2.81	2.90	3.06	3.57	4.08	
	20	2.83	2.82	2.95	3.04	3.14	3.24	3.45	3.56	3.78	4.46	5.17	
	30	3.16	3.17	3.34	3.45	3.57	3.69	3.95	4.09	4.36	5.21	6.12	
	40	3.44	3.46	3.67	3.81	3.95	4.09	4.40	4.55	4.88	5.90	7.00	
	60	3.90	3.96	4.24	4.42	4.60	4.79	5.19	5.39	5.81	7.17	8.61	
	70	4.10	4.17	4.50	4.69	4.90	5.11	5.55	5.78	6.25	7.76	9.38	
	80	4.28	4.38	4.74	4.96	5.18	5.41	5.90	6.15	6.67	8.34	10.11	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.5 m (RADIUS = 9.5 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °C	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
150 												

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.5 m (RADIUS = 9.5 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s²)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
0	5	1.64	1.68	1.86	1.96	2.07	2.18	2.40	2.51	2.74	3.42	4.11
	10	1.90	2.01	2.29	2.44	2.59	2.75	3.06	3.22	3.53	4.49	5.46
	20	2.34	2.56	3.02	3.25	3.48	3.71	4.17	4.40	4.87	6.29	7.74
	30	2.72	3.04	3.65	3.95	4.25	4.55	5.14	5.44	6.04	7.86	9.73
	40	3.07	3.48	4.24	4.60	4.96	5.32	6.04	6.40	7.12	9.31	11.56
	60	3.71	4.29	5.30	5.79	6.26	6.74	7.68	8.15	9.09	11.96	14.92
	70	4.01	4.66	5.80	6.34	6.87	7.40	8.44	8.96	10.01	13.20	16.48
	80	4.30	5.03	6.29	6.88	7.46	8.03	9.18	9.75	10.90	14.40	18.00
10	5	2.04	2.02	2.13	2.21	2.30	2.39	2.59	2.69	2.90	3.55	4.22
	10	2.33	2.34	2.54	2.67	2.80	2.94	3.22	3.37	3.67	4.60	5.56
	20	2.76	2.87	3.24	3.44	3.65	3.87	4.31	4.53	4.99	6.38	7.82
	30	3.13	3.33	3.85	4.13	4.41	4.70	5.27	5.56	6.15	7.95	9.80
	40	3.46	3.75	4.42	4.76	5.11	5.46	6.16	6.51	7.22	9.39	11.63
	60	4.07	4.53	5.47	5.94	6.40	6.86	7.78	8.25	9.18	12.03	14.98
	70	4.36	4.90	5.97	6.49	7.00	7.52	8.54	9.06	10.10	13.27	16.54
	80	4.64	5.26	6.44	7.02	7.58	8.15	9.28	9.85	10.98	14.46	18.05
20	5	2.23	2.20	2.31	2.39	2.47	2.56	2.75	2.85	3.05	3.68	4.34
	10	2.57	2.57	2.75	2.86	2.98	3.11	3.38	3.52	3.81	4.71	5.65
	20	3.05	3.12	3.44	3.63	3.82	4.03	4.45	4.66	5.11	6.48	7.90
	30	3.44	3.58	4.04	4.30	4.57	4.84	5.40	5.68	6.26	8.03	9.88
	40	3.78	4.00	4.60	4.93	5.26	5.59	6.27	6.62	7.32	9.47	11.70
	60	4.40	4.77	5.64	6.08	6.53	6.98	7.89	8.35	9.27	12.11	15.04
	70	4.68	5.13	6.13	6.63	7.13	7.63	8.65	9.16	10.19	13.34	16.60
	80	4.96	5.49	6.60	7.15	7.71	8.26	9.38	9.94	11.07	14.53	18.11
50	5	2.59	2.55	2.66	2.74	2.82	2.91	3.10	3.20	3.40	4.01	4.65
	10	3.02	3.01	3.17	3.28	3.39	3.52	3.77	3.90	4.18	5.03	5.93
	20	3.62	3.65	3.92	4.09	4.27	4.45	4.84	5.04	5.45	6.75	8.14
	30	4.07	4.16	4.54	4.77	5.00	5.25	5.76	6.03	6.57	8.29	10.10
	40	4.47	4.61	5.10	5.38	5.68	5.98	6.62	6.95	7.61	9.71	11.90
	60	5.14	5.40	6.12	6.51	6.92	7.34	8.20	8.65	9.54	12.32	15.22
	70	5.45	5.76	6.59	7.04	7.51	7.98	8.95	9.44	10.45	13.55	16.78
	80	5.73	6.11	7.05	7.56	8.08	8.60	9.67	10.22	11.32	14.73	18.28
100	5	2.95	2.91	3.02	3.10	3.20	3.29	3.49	3.59	3.80	4.42	5.06
	10	3.49	3.47	3.63	3.74	3.86	3.98	4.24	4.37	4.65	5.49	6.36
	20	4.21	4.23	4.49	4.65	4.82	5.00	5.37	5.56	5.95	7.20	8.53
	30	4.76	4.82	5.17	5.38	5.60	5.83	6.31	6.56	7.07	8.70	10.45
	40	5.22	5.32	5.76	6.02	6.29	6.57	7.16	7.46	8.09	10.10	12.24
	60	5.99	6.18	6.81	7.16	7.53	7.91	8.72	9.13	9.98	12.68	15.53
	70	6.33	6.57	7.28	7.69	8.11	8.54	9.45	9.92	10.87	13.89	17.07
	80	6.65	6.94	7.74	8.19	8.66	9.15	10.16	10.68	11.74	15.07	18.57

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.5 m (RADIUS = 9.5 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 (m*s) ^{1/2}	5	3.21	3.17	3.29	3.37	3.47	3.57	3.77	3.88	4.09	4.74	5.39	
	10	3.83	3.80	3.97	4.08	4.20	4.33	4.60	4.73	5.01	5.86	6.73	
	20	4.65	4.66	4.92	5.08	5.25	5.43	5.80	5.99	6.38	7.60	8.90	
	30	5.26	5.31	5.65	5.85	6.07	6.30	6.77	7.01	7.51	9.10	10.80	
	40	5.77	5.86	6.28	6.53	6.79	7.06	7.63	7.93	8.54	10.48	12.57	
	60	6.63	6.79	7.37	7.71	8.06	8.43	9.19	9.59	10.41	13.03	15.83	
	70	7.00	7.20	7.87	8.25	8.64	9.06	9.92	10.37	11.29	14.23	17.36	
	80	7.35	7.59	8.34	8.76	9.20	9.66	10.62	11.12	12.14	15.40	18.85	
200	5	3.43	3.38	3.50	3.59	3.69	3.79	4.01	4.12	4.34	5.00	5.66	
	10	4.10	4.08	4.24	4.36	4.49	4.62	4.89	5.03	5.31	6.18	7.06	
	20	5.00	5.01	5.27	5.43	5.60	5.78	6.16	6.35	6.74	7.97	9.25	
	30	5.67	5.71	6.05	6.25	6.47	6.70	7.17	7.41	7.91	9.47	11.14	
	40	6.23	6.30	6.71	6.96	7.22	7.49	8.05	8.35	8.94	10.85	12.89	
	60	7.15	7.29	7.85	8.18	8.53	8.89	9.63	10.02	10.82	13.38	16.13	
	70	7.55	7.73	8.37	8.73	9.12	9.52	10.36	10.80	11.69	14.57	17.65	
	80	7.92	8.13	8.85	9.26	9.69	10.13	11.06	11.55	12.54	15.72	19.13	
250	5	3.61	3.57	3.69	3.78	3.88	3.99	4.21	4.32	4.55	5.23	5.91	
	10	4.34	4.31	4.48	4.60	4.73	4.87	5.15	5.29	5.58	6.46	7.35	
	20	5.31	5.31	5.57	5.73	5.91	6.09	6.47	6.67	7.06	8.29	9.57	
	30	6.02	6.06	6.39	6.60	6.82	7.05	7.52	7.76	8.26	9.82	11.47	
	40	6.62	6.68	7.09	7.34	7.60	7.87	8.43	8.72	9.31	11.20	13.21	
	60	7.59	7.73	8.28	8.60	8.95	9.30	10.04	10.42	11.20	13.72	16.43	
	70	8.02	8.18	8.81	9.17	9.55	9.95	10.77	11.20	12.08	14.90	17.94	
	80	8.41	8.61	9.31	9.71	10.13	10.57	11.48	11.95	12.92	16.05	19.41	
300	5	3.77	3.73	3.85	3.95	4.05	4.16	4.39	4.50	4.73	5.43	6.12	
	10	4.55	4.52	4.69	4.82	4.95	5.09	5.37	5.52	5.81	6.71	7.61	
	20	5.58	5.57	5.84	6.00	6.18	6.37	6.76	6.95	7.36	8.59	9.88	
	30	6.33	6.36	6.70	6.91	7.13	7.36	7.84	8.08	8.58	10.14	11.78	
	40	6.96	7.02	7.43	7.68	7.94	8.21	8.77	9.06	9.66	11.53	13.52	
	60	7.99	8.11	8.66	8.98	9.32	9.68	10.41	10.79	11.56	14.04	16.72	
	70	8.44	8.59	9.21	9.57	9.95	10.34	11.15	11.57	12.44	15.22	18.23	
	80	8.85	9.03	9.72	10.12	10.53	10.97	11.86	12.33	13.29	16.37	19.69	
400	5	4.05	4.00	4.14	4.24	4.34	4.46	4.69	4.81	5.05	5.78	6.50	
	10	4.91	4.87	5.06	5.18	5.32	5.47	5.76	5.92	6.22	7.15	8.08	
	20	6.04	6.03	6.30	6.47	6.66	6.85	7.25	7.45	7.87	9.13	10.42	
	30	6.87	6.89	7.23	7.45	7.68	7.91	8.40	8.65	9.15	10.72	12.36	
	40	7.55	7.61	8.02	8.27	8.54	8.81	9.38	9.67	10.27	12.13	14.11	
	60	8.68	8.79	9.33	9.66	10.00	10.35	11.08	11.45	12.23	14.67	17.29	
	70	9.16	9.30	9.91	10.27	10.65	11.03	11.84	12.26	13.12	15.85	18.79	
	80	9.61	9.78	10.45	10.84	11.26	11.68	12.57	13.03	13.97	16.98	20.24	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.5 m (RADIUS = 9.5 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE		CEILING HEIGHT, m										
(m*s) ^{1/2}		°C		1	2	4	5	6	7	9	10	12	18	24
0	5	2.42	2.54	2.89	3.07	3.26	3.44	3.82	4.02	4.40	4.58	5.58	6.77	
	10	2.94	3.20	3.75	4.03	4.31	4.58	5.15	5.43	5.99	6.27	7.72	9.48	
	20	3.81	4.29	5.20	5.64	6.07	6.50	7.37	7.80	8.67	9.10	11.31	14.03	
	30	4.58	5.25	6.47	7.05	7.62	8.19	9.31	9.88	11.01	11.47	14.47	18.02	
	40	5.28	6.14	7.63	8.34	9.04	9.73	11.10	11.79	13.17	13.66	17.36	21.68	
	60	6.56	7.75	9.77	10.72	11.64	12.56	14.38	15.29	17.11	17.66	22.66	28.39	
	70	7.16	8.51	10.77	11.83	12.86	13.88	15.91	16.92	18.95	19.51	25.14	31.52	
	80	7.74	9.24	11.73	12.90	14.03	15.16	17.39	18.50	20.73	21.53	27.53	34.55	
10	5	2.93	2.94	3.18	3.34	3.50	3.67	4.02	4.20	4.57	4.71	5.71	6.89	
	10	3.45	3.57	4.01	4.26	4.51	4.78	5.31	5.58	6.14	6.33	7.83	9.57	
	20	4.28	4.62	5.42	5.83	6.25	6.67	7.51	7.93	8.79	9.21	11.41	14.11	
	30	5.01	5.55	6.67	7.22	7.78	8.33	9.44	10.00	11.12	11.55	14.55	18.09	
	40	5.68	6.41	7.82	8.51	9.19	9.87	11.22	11.90	13.27	13.74	17.44	21.75	
	60	6.93	8.00	9.94	10.87	11.78	12.68	14.49	15.39	17.20	17.74	22.74	28.45	
	70	7.51	8.75	10.93	11.97	12.99	14.00	16.01	17.02	19.04	19.51	25.21	31.58	
	80	8.08	9.47	11.89	13.03	14.16	15.27	17.49	18.59	20.82	21.60	27.60	34.60	
20	5	3.22	3.21	3.43	3.57	3.72	3.88	4.21	4.38	4.73	4.84	5.84	7.00	
	10	3.79	3.87	4.25	4.48	4.72	4.96	5.48	5.74	6.28	6.44	7.94	9.67	
	20	4.66	4.92	5.63	6.02	6.42	6.83	7.65	8.06	8.91	9.33	11.50	14.19	
	30	5.39	5.83	6.87	7.40	7.94	8.48	9.57	10.12	11.23	11.66	14.64	18.16	
	40	6.06	6.68	8.01	8.67	9.34	10.00	11.34	12.01	13.37	13.81	17.52	21.81	
	60	7.28	8.25	10.11	11.01	11.91	12.80	14.59	15.49	17.29	17.74	22.81	28.51	
	70	7.86	8.98	11.09	12.11	13.12	14.12	16.11	17.12	19.13	19.58	25.28	31.64	
	80	8.42	9.70	12.05	13.17	14.28	15.39	17.59	18.69	20.90	21.67	27.67	34.66	
50	5	3.75	3.73	3.93	4.06	4.21	4.36	4.67	4.84	5.17	5.27	6.22	7.33	
	10	4.46	4.50	4.83	5.03	5.24	5.47	5.94	6.18	6.68	6.84	8.27	9.96	
	20	5.48	5.64	6.23	6.57	6.92	7.29	8.06	8.45	9.26	9.68	11.79	14.43	
	30	6.28	6.58	7.44	7.91	8.40	8.91	9.94	10.47	11.55	11.98	14.89	18.38	
	40	6.98	7.42	8.55	9.15	9.77	10.40	11.69	12.34	13.67	14.11	17.76	22.02	
	60	8.23	8.96	10.61	11.45	12.31	13.17	14.91	15.79	17.56	18.03	23.03	28.69	
	70	8.80	9.68	11.58	12.54	13.50	14.47	16.42	17.41	19.39	19.84	25.49	31.82	
	80	9.35	10.37	12.51	13.58	14.66	15.73	17.88	18.97	21.15	21.62	27.87	34.83	
100	5	4.31	4.28	4.48	4.61	4.76	4.91	5.23	5.39	5.73	5.84	6.76	7.84	
	10	5.18	5.19	5.50	5.69	5.90	6.12	6.57	6.81	7.28	7.39	8.80	10.42	
	20	6.37	6.49	7.01	7.32	7.65	7.99	8.70	9.07	9.83	10.26	12.25	14.83	
	30	7.29	7.51	8.25	8.68	9.12	9.59	10.55	11.05	12.08	12.51	15.32	18.74	
	40	8.08	8.40	9.37	9.91	10.47	11.06	12.27	12.89	14.16	14.60	18.16	22.36	
	60	9.43	9.98	11.40	12.17	12.96	13.77	15.44	16.29	18.01	18.46	23.39	29.00	
	70	10.03	10.71	12.35	13.23	14.13	15.05	16.93	17.88	19.82	20.29	25.84	32.11	
	80	10.61	11.40	13.27	14.26	15.27	16.29	18.37	19.43	21.57	22.04	28.21	35.12	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.5 m (RADIUS = 9.5 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 (m*s) ^{1/2}	5	4.72	4.68	4.88	5.02	5.17	5.33	5.65	5.82	6.16	7.21	8.29	
	10	5.69	5.70	6.01	6.20	6.41	6.63	7.08	7.31	7.79	9.28	10.86	
	20	7.03	7.13	7.63	7.93	8.25	8.58	9.26	9.62	10.36	12.70	15.22	
	30	8.04	8.23	8.93	9.33	9.76	10.20	11.12	11.60	12.59	15.74	19.10	
	40	8.90	9.18	10.07	10.58	11.11	11.67	12.82	13.42	14.65	18.55	22.69	
	60	10.35	10.83	12.12	12.84	13.59	14.36	15.95	16.78	18.46	23.74	29.31	
	70	11.00	11.57	13.07	13.89	14.75	15.62	17.43	18.36	20.25	26.18	32.41	
	80	11.61	12.28	13.99	14.91	15.87	16.85	18.86	19.89	21.99	28.54	35.40	
200	5	5.04	5.00	5.21	5.35	5.51	5.67	6.00	6.18	6.52	7.59	8.67	
	10	6.12	6.12	6.42	6.62	6.83	7.05	7.51	7.74	8.22	9.71	11.28	
	20	7.57	7.65	8.14	8.44	8.76	9.08	9.76	10.12	10.84	13.14	15.61	
	30	8.66	8.83	9.50	9.90	10.31	10.74	11.64	12.11	13.07	16.15	19.46	
	40	9.58	9.83	10.68	11.18	11.69	12.23	13.34	13.92	15.12	18.94	23.03	
	60	11.13	11.55	12.77	13.46	14.17	14.92	16.46	17.26	18.90	24.10	29.61	
	70	11.81	12.32	13.73	14.51	15.33	16.17	17.92	18.83	20.68	26.53	32.70	
	80	12.45	13.05	14.65	15.53	16.44	17.39	19.34	20.35	22.40	28.87	35.69	
250	5	5.32	5.28	5.49	5.64	5.80	5.96	6.31	6.48	6.84	7.92	9.02	
	10	6.48	6.47	6.78	6.98	7.20	7.42	7.89	8.12	8.61	10.10	11.66	
	20	8.03	8.10	8.59	8.89	9.21	9.53	10.21	10.56	11.28	13.55	15.99	
	30	9.19	9.34	10.01	10.40	10.81	11.23	12.12	12.58	13.53	16.55	19.81	
	40	10.17	10.40	11.23	11.71	12.22	12.74	13.83	14.40	15.57	19.32	23.36	
	60	11.80	12.19	13.36	14.03	14.72	15.44	16.95	17.73	19.33	24.45	29.91	
	70	12.51	12.98	14.34	15.09	15.88	16.70	18.40	19.29	21.10	26.87	32.99	
	80	13.18	13.74	15.27	16.11	17.00	17.91	19.81	20.80	22.81	29.20	35.97	
300	5	5.57	5.53	5.74	5.89	6.05	6.22	6.57	6.75	7.12	8.22	9.33	
	10	6.79	6.79	7.10	7.30	7.52	7.75	8.22	8.46	8.95	10.46	12.02	
	20	8.44	8.50	8.99	9.29	9.61	9.94	10.62	10.97	11.69	13.95	16.36	
	30	9.67	9.80	10.46	10.85	11.26	11.68	12.56	13.02	13.96	16.94	20.16	
	40	10.69	10.90	11.72	12.20	12.70	13.21	14.29	14.85	16.01	19.70	23.69	
	60	12.39	12.76	13.91	14.56	15.24	15.94	17.41	18.18	19.76	24.80	30.21	
	70	13.14	13.58	14.89	15.63	16.40	17.20	18.87	19.73	21.52	27.21	33.28	
	80	13.83	14.36	15.83	16.66	17.52	18.41	20.27	21.24	23.22	29.53	36.25	
400	5	6.00	5.95	6.17	6.33	6.50	6.68	7.04	7.23	7.60	8.74	9.88	
	10	7.35	7.33	7.65	7.86	8.09	8.32	8.81	9.06	9.56	11.10	12.67	
	20	9.15	9.20	9.69	10.00	10.32	10.65	11.34	11.70	12.42	14.67	17.05	
	30	10.49	10.61	11.26	11.65	12.06	12.48	13.36	13.81	14.74	17.69	20.84	
	40	11.59	11.78	12.59	13.06	13.56	14.07	15.14	15.69	16.82	20.44	24.34	
	60	13.43	13.76	14.87	15.51	16.17	16.86	18.29	19.04	20.57	25.50	30.81	
	70	14.23	14.63	15.90	16.61	17.36	18.13	19.75	20.59	22.32	27.88	33.86	
	80	14.98	15.45	16.86	17.66	18.49	19.35	21.15	22.09	24.01	30.19	36.81	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.5 m (RADIUS = 9.5 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	°C												
	5	3.72	4.01	4.67	5.00	5.34	5.68	6.37	6.71	7.40	9.49	11.64	
	10	4.75	5.31	6.39	6.92	7.44	7.96	9.01	9.53	10.58	13.77	17.05	
	20	6.49	7.50	9.29	10.14	10.97	11.80	13.45	14.27	15.93	20.96	26.15	
	30	8.02	9.43	11.83	12.96	14.07	15.17	17.34	18.43	20.62	27.27	34.12	
	40	9.42	11.19	14.17	15.55	16.91	18.25	20.92	22.25	24.92	33.06	41.45	
	60	11.99	14.42	18.44	20.30	22.12	23.91	27.47	29.25	32.81	43.67	54.86	
	70	13.19	15.93	20.44	22.52	24.55	26.56	30.53	32.52	36.50	48.63	61.13	
10	80	14.34	17.39	22.36	24.66	26.90	29.11	33.49	35.67	40.05	53.41	67.18	
	5	4.32	4.45	4.98	5.28	5.59	5.91	6.56	6.89	7.57	9.63	11.75	
	10	5.30	5.70	6.65	7.15	7.65	8.16	9.17	9.69	10.72	13.88	17.14	
	20	6.97	7.83	9.51	10.33	11.15	11.96	13.59	14.41	16.05	21.06	26.23	
	30	8.45	9.72	12.03	13.14	14.23	15.31	17.47	18.55	20.73	27.36	34.20	
	40	9.83	11.47	14.35	15.72	17.06	18.39	21.04	22.36	25.02	33.14	41.52	
	60	12.35	14.67	18.61	20.45	22.25	24.04	27.58	29.35	32.90	43.74	54.92	
	70	13.54	16.18	20.60	22.66	24.68	26.67	30.64	32.62	36.59	48.70	61.19	
20	80	14.69	17.63	22.52	24.80	27.02	29.22	33.59	35.77	40.14	53.48	67.24	
	5	4.73	4.81	5.27	5.54	5.83	6.13	6.76	7.08	7.73	9.76	11.87	
	10	5.76	6.06	6.91	7.38	7.86	8.35	9.34	9.84	10.86	14.00	17.24	
	20	7.42	8.15	9.73	10.53	11.33	12.13	13.73	14.54	16.17	21.16	26.31	
	30	8.88	10.01	12.23	13.31	14.39	15.46	17.60	18.67	20.83	27.44	34.27	
	40	10.23	11.74	14.54	15.88	17.21	18.53	21.16	22.48	25.13	33.22	41.58	
	60	12.72	14.92	18.78	20.60	22.39	24.16	27.69	29.45	32.99	43.81	54.99	
	70	13.89	16.41	20.76	22.80	24.81	26.79	30.74	32.71	36.67	48.77	61.25	
50	80	15.03	17.86	22.68	24.94	27.15	29.34	33.69	35.86	40.22	53.54	67.30	
	5	5.53	5.56	5.95	6.20	6.46	6.73	7.31	7.61	8.22	10.16	12.20	
	10	6.73	6.91	7.62	8.03	8.46	8.90	9.83	10.31	11.28	14.33	17.53	
	20	8.52	9.03	10.38	11.10	11.85	12.60	14.15	14.93	16.52	21.44	26.55	
	30	10.00	10.86	12.82	13.84	14.86	15.89	17.98	19.03	21.16	27.70	34.49	
	40	11.34	12.54	15.09	16.37	17.65	18.93	21.51	22.81	25.43	33.46	41.79	
	60	13.78	15.66	19.28	21.04	22.79	24.53	28.01	29.75	33.27	44.03	55.17	
	70	14.92	17.13	21.25	23.23	25.20	27.15	31.05	33.00	36.94	48.97	61.43	
100	80	16.03	18.55	23.15	25.35	27.52	29.68	33.99	36.14	40.48	53.75	67.47	
	5	6.37	6.38	6.75	6.99	7.24	7.51	8.06	8.35	8.93	10.79	12.76	
	10	7.79	7.92	8.55	8.92	9.32	9.73	10.59	11.04	11.96	14.89	18.00	
	20	9.82	10.20	11.35	12.00	12.68	13.38	14.83	15.58	17.11	21.91	26.95	
	30	11.43	12.08	13.77	14.69	15.64	16.61	18.60	19.62	21.69	28.13	34.85	
	40	12.83	13.76	15.99	17.17	18.38	19.60	22.10	23.36	25.93	33.86	42.13	
	60	15.32	16.83	20.11	21.77	23.45	25.14	28.54	30.25	33.72	44.39	55.48	
	70	16.47	18.27	22.05	23.94	25.84	27.74	31.56	33.49	37.37	49.32	61.72	
80	17.57	19.67	23.92	26.04	28.14	30.25	34.48	36.61	40.90	54.08	67.75		

SPACING = 13.5 m (RADIUS = 9.5 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

CEILING HEIGHT, m

RESPONSE TEMPERATURE
 TIME INDEX RISE

(m*s) ^{1/2}	1	2	4	5	6	7	9	10	12	18	24
150	6.99 8.58 10.80 12.53 14.02 16.61 17.79 18.91	6.99 8.68 11.12 13.08 14.81 17.91 19.35 20.73	7.35 9.28 12.19 14.63 16.84 20.92 22.83 24.69	7.59 9.64 12.80 15.49 17.95 22.50 24.64 26.71	7.85 10.03 13.44 16.38 19.09 24.11 26.47 28.76	8.11 10.43 14.10 17.30 20.26 25.74 28.32 30.82	8.67 11.26 15.49 19.22 22.68 29.06 32.07 34.97	8.95 11.70 16.21 20.20 23.91 30.75 33.97 37.07	9.53 12.59 17.69 22.22 26.42 34.17 37.81 41.32	11.36 15.43 22.38 28.55 34.26 44.75 49.67 54.42	13.28 18.47 27.35 35.22 42.47 55.78 62.02 68.04
200	7.49 9.22 11.61 13.45 15.02 17.72 18.93 20.08	7.48 9.30 11.90 13.94 15.73 18.88 20.33 21.72	7.85 9.89 12.92 15.40 17.63 21.69 23.60 25.44	8.09 10.26 13.51 16.22 18.69 23.20 25.33 27.39	8.35 10.64 14.13 17.08 19.78 24.75 27.10 29.37	8.62 11.03 14.77 17.97 20.91 26.34 28.90 31.38	9.18 11.86 16.11 19.82 23.25 29.59 32.57 35.46	9.46 12.28 16.81 20.78 24.45 31.25 34.44 37.54	10.05 13.16 18.25 22.74 26.91 34.62 38.24 41.74	11.87 15.94 22.84 28.98 34.65 45.11 50.02 54.75	13.78 18.93 27.75 35.58 42.80 56.09 62.31 68.33
250	7.92 9.77 12.31 14.24 15.89 18.69 19.95 21.13	7.90 9.84 12.57 14.70 16.54 19.76 21.23 22.63	8.27 10.43 13.56 16.10 18.36 22.44 24.33 26.17	8.52 10.79 14.14 16.90 19.38 23.89 26.00 28.05	8.78 11.17 14.75 17.73 20.44 25.39 27.72 29.97	9.06 11.57 15.38 18.60 21.53 26.93 29.47 31.93	9.62 12.39 16.70 20.40 23.81 30.11 33.08 35.95	9.91 12.82 17.38 21.33 24.98 31.74 34.92 38.00	10.50 13.68 18.79 23.26 27.40 35.06 38.67 42.16	12.33 16.44 23.30 29.40 35.05 45.47 50.36 55.09	14.23 19.38 28.15 35.94 43.14 56.40 62.61 68.61
300	8.30 10.25 12.93 14.95 16.67 19.57 20.86 22.08	8.28 10.32 13.17 15.38 17.28 20.57 22.06 23.48	8.65 10.91 14.15 16.75 19.04 23.14 25.04 26.87	8.90 11.27 14.72 17.53 20.03 24.55 26.65 28.69	9.17 11.65 15.32 18.34 21.06 26.01 28.32 30.57	9.45 12.05 15.95 19.19 22.13 27.51 30.04 32.49	10.02 12.88 17.25 20.96 24.35 30.62 33.58 36.44	10.32 13.30 17.92 21.87 25.51 32.23 35.39 38.46	10.91 14.17 19.30 23.76 27.88 35.51 39.10 42.57	12.76 16.90 23.75 29.81 35.44 45.83 50.70 55.42	14.66 19.82 28.54 36.30 43.48 56.70 62.90 68.89
400	8.95 11.10 14.00 16.19 18.03 21.12 22.48 23.76	8.93 11.15 14.22 16.57 18.58 22.02 23.56 25.02	9.31 11.74 15.18 17.90 20.27 24.44 26.36 28.20	9.57 12.11 15.75 18.66 21.22 25.78 27.90 29.93	9.84 12.50 16.34 19.45 22.22 27.18 29.49 31.72	10.13 12.90 16.96 20.28 23.25 28.63 31.14 33.57	10.72 13.73 18.25 22.00 25.40 31.63 34.56 37.40	11.02 14.16 18.91 22.89 26.52 33.19 36.33 39.37	11.64 15.04 20.27 24.73 28.83 36.39 39.95 43.40	13.51 17.77 24.62 30.64 36.22 46.54 51.39 56.09	15.43 20.65 29.31 37.01 44.14 57.31 63.49 69.46

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 m (RADIUS = 9.9 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
0	5	1.19	1.19	1.28	1.34	1.40	1.47	1.60	1.67	1.80	2.22	2.64	
	10	1.32	1.35	1.50	1.59	1.67	1.76	1.94	2.03	2.21	2.76	3.32	
	20	1.54	1.64	1.88	2.00	2.13	2.25	2.51	2.64	2.89	3.68	4.48	
	30	1.74	1.89	2.20	2.36	2.52	2.68	3.01	3.17	3.49	4.48	5.49	
	40	1.92	2.11	2.50	2.70	2.89	3.08	3.46	3.66	4.04	5.21	6.42	
	60	2.25	2.53	3.05	3.31	3.56	3.81	4.30	4.55	5.05	6.56	8.12	
	70	2.41	2.73	3.31	3.59	3.87	4.14	4.69	4.97	5.52	7.19	8.91	
	80	2.56	2.91	3.56	3.87	4.17	4.47	5.07	5.37	5.97	7.80	9.68	
10	5	1.49	1.45	1.51	1.56	1.61	1.66	1.78	1.84	1.96	2.35	2.75	
	10	1.66	1.64	1.73	1.80	1.87	1.94	2.10	2.18	2.35	2.87	3.42	
	20	1.91	1.93	2.09	2.19	2.30	2.41	2.65	2.77	3.01	3.77	4.56	
	30	2.11	2.16	2.40	2.54	2.68	2.83	3.13	3.29	3.60	4.57	5.56	
	40	2.29	2.38	2.69	2.86	3.04	3.22	3.58	3.77	4.14	5.30	6.49	
	60	2.60	2.78	3.22	3.46	3.69	3.93	4.41	4.65	5.14	6.64	8.18	
	70	2.75	2.97	3.47	3.74	4.00	4.26	4.80	5.07	5.61	7.26	8.97	
	80	2.89	3.15	3.72	4.01	4.30	4.59	5.17	5.47	6.06	7.87	9.74	
20	5	1.62	1.58	1.64	1.68	1.73	1.79	1.91	1.97	2.09	2.47	2.86	
	10	1.83	1.80	1.89	1.95	2.02	2.09	2.24	2.32	2.48	2.98	3.51	
	20	2.12	2.12	2.26	2.36	2.46	2.56	2.78	2.90	3.13	3.87	4.64	
	30	2.34	2.37	2.58	2.70	2.83	2.97	3.26	3.41	3.71	4.65	5.63	
	40	2.54	2.60	2.86	3.02	3.18	3.35	3.70	3.88	4.24	5.38	6.55	
	60	2.87	3.00	3.39	3.60	3.82	4.05	4.52	4.75	5.23	6.71	8.24	
	70	3.03	3.18	3.63	3.88	4.13	4.38	4.90	5.16	5.69	7.33	9.03	
	80	3.17	3.36	3.87	4.14	4.42	4.70	5.27	5.56	6.14	7.94	9.80	
50	5	1.86	1.82	1.87	1.92	1.98	2.03	2.15	2.22	2.34	2.73	3.12	
	10	2.13	2.10	2.18	2.25	2.32	2.39	2.54	2.62	2.78	3.27	3.78	
	20	2.50	2.49	2.63	2.71	2.81	2.91	3.11	3.22	3.44	4.14	4.88	
	30	2.79	2.80	2.97	3.09	3.21	3.33	3.60	3.73	4.01	4.90	5.85	
	40	3.02	3.05	3.28	3.41	3.56	3.71	4.03	4.20	4.53	5.61	6.76	
	60	3.42	3.50	3.81	4.00	4.20	4.40	4.83	5.05	5.50	6.93	8.43	
	70	3.59	3.70	4.06	4.27	4.49	4.72	5.20	5.45	5.95	7.54	9.21	
	80	3.76	3.88	4.30	4.53	4.78	5.04	5.57	5.84	6.40	8.14	9.97	
100	5	2.10	2.06	2.12	2.17	2.23	2.29	2.42	2.48	2.62	3.02	3.42	
	10	2.45	2.41	2.50	2.56	2.64	2.71	2.87	2.95	3.11	3.62	4.13	
	20	2.91	2.89	3.02	3.11	3.21	3.31	3.52	3.62	3.84	4.53	5.24	
	30	3.25	3.25	3.42	3.53	3.65	3.77	4.03	4.16	4.44	5.29	6.20	
	40	3.54	3.56	3.76	3.90	4.04	4.18	4.49	4.64	4.97	5.99	7.09	
	60	4.01	4.06	4.35	4.52	4.71	4.90	5.29	5.50	5.92	7.28	8.73	
	70	4.22	4.29	4.61	4.81	5.01	5.22	5.67	5.90	6.37	7.89	9.51	
	80	4.41	4.50	4.86	5.08	5.30	5.53	6.02	6.28	6.80	8.47	10.25	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 m (RADIUS = 9.9 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE		CEILING HEIGHT, m											
(m*s) ^{1/2}		°C		1	2	4	5	6	7	9	10	12	18	24	
150	5	2.28	2.23	2.30	2.35	2.41	2.48	2.61	2.68	2.82	3.24	3.65			
	10	2.67	2.64	2.73	2.80	2.87	2.95	3.11	3.20	3.37	3.89	4.41			
	20	3.20	3.18	3.31	3.40	3.50	3.61	3.82	3.93	4.15	4.84	5.56			
	30	3.59	3.59	3.76	3.87	3.99	4.11	4.37	4.51	4.78	5.63	6.52			
	40	3.91	3.92	4.13	4.26	4.40	4.55	4.85	5.01	5.33	6.34	7.41			
	60	4.44	4.48	4.76	4.93	5.11	5.30	5.69	5.89	6.30	7.62	9.03			
	70	4.67	4.73	5.04	5.23	5.43	5.64	6.07	6.29	6.75	8.22	9.80			
	80	4.89	4.96	5.31	5.51	5.73	5.96	6.43	6.68	7.18	8.80	10.54			
200	5	2.42	2.37	2.44	2.50	2.56	2.63	2.77	2.84	2.98	3.42	3.84			
	10	2.86	2.82	2.91	2.98	3.06	3.14	3.31	3.40	3.58	4.11	4.64			
	20	3.44	3.42	3.55	3.65	3.75	3.85	4.07	4.19	4.41	5.12	5.83			
	30	3.87	3.86	4.03	4.14	4.27	4.39	4.66	4.79	5.07	5.93	6.82			
	40	4.22	4.22	4.43	4.56	4.71	4.85	5.16	5.32	5.64	6.64	7.70			
	60	4.80	4.83	5.10	5.27	5.45	5.64	6.03	6.23	6.64	7.93	9.32			
	70	5.05	5.09	5.40	5.59	5.79	5.99	6.42	6.64	7.09	8.53	10.08			
	80	5.28	5.34	5.68	5.88	6.10	6.32	6.79	7.03	7.53	9.11	10.81			
250	5	2.54	2.50	2.57	2.63	2.69	2.76	2.90	2.98	3.12	3.57	4.01			
	10	3.02	2.98	3.07	3.15	3.23	3.31	3.49	3.58	3.76	4.30	4.85			
	20	3.64	3.62	3.76	3.85	3.96	4.06	4.29	4.41	4.64	5.35	6.08			
	30	4.10	4.09	4.26	4.38	4.51	4.64	4.91	5.04	5.33	6.19	7.08			
	40	4.48	4.48	4.69	4.83	4.97	5.12	5.43	5.59	5.92	6.92	7.98			
	60	5.10	5.13	5.40	5.57	5.75	5.94	6.33	6.53	6.94	8.23	9.60			
	70	5.37	5.41	5.71	5.90	6.10	6.30	6.73	6.95	7.40	8.83	10.35			
	80	5.61	5.67	6.00	6.21	6.42	6.65	7.11	7.35	7.84	9.41	11.08			
300	5	2.65	2.60	2.68	2.74	2.80	2.87	3.02	3.10	3.25	3.70	4.15			
	10	3.15	3.11	3.21	3.29	3.37	3.46	3.64	3.73	3.92	4.48	5.03			
	20	3.82	3.80	3.94	4.03	4.14	4.25	4.48	4.60	4.84	5.57	6.31			
	30	4.31	4.30	4.47	4.59	4.72	4.85	5.13	5.27	5.55	6.43	7.33			
	40	4.71	4.71	4.92	5.06	5.20	5.36	5.67	5.83	6.16	7.18	8.24			
	60	5.37	5.39	5.67	5.84	6.02	6.21	6.60	6.80	7.21	8.50	9.86			
	70	5.65	5.68	5.99	6.18	6.38	6.59	7.02	7.24	7.69	9.11	10.62			
	80	5.91	5.96	6.29	6.50	6.72	6.94	7.41	7.65	8.14	9.69	11.35			
400	5	2.83	2.79	2.86	2.93	3.00	3.07	3.23	3.30	3.46	3.94	4.41			
	10	3.39	3.35	3.46	3.54	3.62	3.71	3.90	4.00	4.19	4.78	5.35			
	20	4.13	4.10	4.25	4.35	4.46	4.58	4.82	4.94	5.19	5.94	6.70			
	30	4.67	4.65	4.83	4.96	5.09	5.23	5.51	5.66	5.95	6.85	7.77			
	40	5.11	5.10	5.32	5.46	5.61	5.77	6.10	6.26	6.60	7.64	8.70			
	60	5.83	5.85	6.13	6.30	6.49	6.68	7.08	7.29	7.70	9.00	10.35			
	70	6.14	6.17	6.47	6.67	6.87	7.08	7.52	7.74	8.20	9.62	11.12			
	80	6.42	6.46	6.80	7.01	7.23	7.45	7.93	8.17	8.66	10.21	11.85			

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 m (RADIUS = 9.9 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	°C	CEILING HEIGHT, m										
			1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2} 0	5	1.70	1.73	1.91	2.01	2.12	2.23	2.45	2.56	2.74	2.95	3.47	4.16
	10	1.97	2.07	2.36	2.51	2.66	2.81	3.13	3.28	3.44	3.60	4.56	5.53
	20	2.42	2.64	3.10	3.33	3.57	3.80	4.26	4.50	4.63	4.96	6.39	7.84
	30	2.81	3.13	3.76	4.06	4.36	4.66	5.26	5.56	5.68	6.16	7.99	9.87
	40	3.17	3.59	4.36	4.73	5.09	5.45	6.17	6.54	6.65	7.26	9.46	11.72
	60	3.84	4.42	5.46	5.95	6.43	6.90	7.85	8.32	8.43	9.27	12.16	15.13
	70	4.15	4.81	5.97	6.52	7.05	7.58	8.63	9.16	9.26	10.21	13.42	16.72
	80	4.45	5.19	6.47	7.07	7.65	8.24	9.39	9.97	10.06	11.12	14.64	18.25
10	5	2.10	2.07	2.19	2.27	2.35	2.45	2.64	2.74	2.91	3.11	3.60	4.28
	10	2.40	2.41	2.61	2.73	2.87	3.01	3.29	3.44	3.59	3.74	4.67	5.63
	20	2.85	2.95	3.32	3.53	3.74	3.96	4.40	4.63	4.76	5.08	6.48	7.92
	30	3.23	3.43	3.96	4.24	4.52	4.81	5.39	5.68	5.80	6.27	8.08	9.94
	40	3.57	3.86	4.54	4.89	5.24	5.59	6.29	6.65	6.76	7.36	9.54	11.79
	60	4.20	4.67	5.63	6.10	6.56	7.03	7.96	8.43	8.53	9.37	12.23	15.19
	70	4.50	5.06	6.13	6.66	7.18	7.70	8.74	9.26	9.36	10.30	13.49	16.78
	80	4.79	5.42	6.63	7.21	7.78	8.35	9.49	10.06	10.16	11.21	14.71	18.31
20	5	2.30	2.26	2.37	2.45	2.53	2.62	2.81	2.91	3.08	3.28	3.73	4.39
	10	2.65	2.64	2.82	2.93	3.05	3.18	3.45	3.59	3.74	3.88	4.78	5.73
	20	3.14	3.21	3.53	3.72	3.92	4.12	4.54	4.76	4.88	5.20	6.58	8.01
	30	3.55	3.69	4.15	4.41	4.68	4.95	5.51	5.80	5.92	6.38	8.16	10.01
	40	3.90	4.12	4.73	5.06	5.39	5.73	6.41	6.76	6.87	7.46	9.63	11.86
	60	4.54	4.92	5.80	6.24	6.70	7.15	8.07	8.53	8.63	9.46	12.31	15.25
	70	4.83	5.29	6.30	6.80	7.31	7.82	8.84	9.36	9.46	10.39	13.56	16.84
	80	5.11	5.65	6.78	7.35	7.91	8.47	9.59	10.16	10.26	11.29	14.77	18.37
50	5	2.66	2.62	2.72	2.80	2.88	2.97	3.16	3.26	3.43	3.66	4.07	4.70
	10	3.11	3.09	3.25	3.35	3.47	3.59	3.85	3.98	4.14	4.25	5.11	6.01
	20	3.72	3.76	4.02	4.19	4.37	4.55	4.94	5.14	5.26	5.55	6.86	8.25
	30	4.20	4.28	4.66	4.89	5.12	5.37	5.89	6.15	6.26	6.70	8.42	10.23
	40	4.60	4.74	5.24	5.52	5.82	6.12	6.76	7.09	7.20	7.76	9.87	12.07
	60	5.30	5.56	6.28	6.68	7.09	7.52	8.39	8.83	8.94	9.73	12.53	15.44
	70	5.61	5.93	6.77	7.23	7.70	8.17	9.15	9.65	9.76	10.65	13.77	17.02
	80	5.91	6.29	7.24	7.76	8.28	8.81	9.89	10.44	10.54	11.55	14.98	18.54
100	5	3.04	2.99	3.10	3.18	3.27	3.36	3.56	3.66	3.83	3.86	4.49	5.12
	10	3.59	3.56	3.72	3.83	3.94	4.07	4.33	4.46	4.62	4.73	5.57	6.44
	20	4.34	4.35	4.60	4.76	4.93	5.11	5.48	5.67	5.79	6.06	7.31	8.64
	30	4.90	4.95	5.30	5.51	5.73	5.96	6.44	6.69	6.80	7.20	8.84	10.60
	40	5.37	5.47	5.91	6.16	6.43	6.72	7.31	7.62	7.73	8.25	10.26	12.41
	60	6.17	6.36	6.98	7.34	7.71	8.10	8.90	9.32	9.43	10.18	12.89	15.75
	70	6.52	6.75	7.47	7.88	8.30	8.74	9.65	10.12	10.23	11.09	14.12	17.31
	80	6.85	7.13	7.95	8.40	8.88	9.36	10.38	10.90	11.01	11.97	15.32	18.83

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 m (RADIUS = 9.9 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
150	5	3.31	3.26	3.37	3.45	3.55	3.64	3.85	3.95	4.16	4.81	5.46
	10	3.94	3.91	4.06	4.18	4.30	4.42	4.69	4.82	5.10	5.95	6.82
	20	4.78	4.79	5.04	5.20	5.37	5.54	5.91	6.10	6.49	7.72	9.02
	30	5.41	5.46	5.79	5.99	6.21	6.44	6.91	7.15	7.65	9.24	10.95
	40	5.94	6.02	6.43	6.68	6.95	7.22	7.79	8.09	8.70	10.65	12.74
	60	6.82	6.97	7.56	7.89	8.25	8.62	9.39	9.79	10.61	13.24	16.05
	70	7.20	7.40	8.06	8.45	8.85	9.26	10.13	10.58	11.51	14.47	17.61
	80	7.56	7.80	8.55	8.97	9.42	9.88	10.85	11.35	12.38	15.65	19.12
200	5	3.53	3.48	3.59	3.68	3.77	3.87	4.08	4.19	4.41	5.07	5.74
	10	4.22	4.19	4.35	4.46	4.59	4.72	4.99	5.13	5.41	6.27	7.15
	20	5.15	5.14	5.39	5.55	5.73	5.91	6.28	6.47	6.86	8.09	9.37
	30	5.83	5.87	6.19	6.40	6.62	6.84	7.31	7.55	8.05	9.62	11.30
	40	6.40	6.47	6.88	7.12	7.38	7.66	8.22	8.51	9.11	11.02	13.07
	60	7.35	7.49	8.05	8.38	8.72	9.08	9.83	10.22	11.02	13.59	16.36
	70	7.76	7.94	8.58	8.95	9.33	9.74	10.58	11.02	11.92	14.81	17.90
	80	8.14	8.35	9.07	9.48	9.92	10.36	11.30	11.78	12.78	15.98	19.40
250	5	3.72	3.66	3.78	3.87	3.97	4.07	4.29	4.40	4.62	5.30	5.98
	10	4.46	4.42	4.59	4.71	4.84	4.97	5.25	5.39	5.68	6.55	7.44
	20	5.46	5.45	5.70	5.87	6.04	6.22	6.60	6.80	7.19	8.42	9.70
	30	6.19	6.22	6.55	6.75	6.97	7.20	7.67	7.91	8.41	9.97	11.63
	40	6.80	6.86	7.26	7.51	7.77	8.04	8.60	8.89	9.49	11.37	13.39
	60	7.81	7.93	8.48	8.81	9.15	9.50	10.24	10.63	11.41	13.94	16.66
	70	8.24	8.40	9.03	9.39	9.77	10.17	11.00	11.42	12.31	15.14	18.19
	80	8.65	8.84	9.54	9.94	10.36	10.80	11.72	12.19	13.17	16.31	19.68
300	5	3.88	3.83	3.95	4.04	4.14	4.25	4.47	4.58	4.81	5.51	6.20
	10	4.68	4.64	4.81	4.93	5.06	5.19	5.48	5.62	5.91	6.81	7.71
	20	5.73	5.72	5.98	6.14	6.32	6.51	6.89	7.09	7.49	8.72	10.01
	30	6.51	6.53	6.86	7.07	7.29	7.52	7.99	8.24	8.74	10.30	11.94
	40	7.15	7.21	7.61	7.86	8.12	8.39	8.95	9.24	9.83	11.71	13.71
	60	8.21	8.33	8.87	9.20	9.54	9.89	10.62	11.00	11.78	14.27	16.95
	70	8.67	8.82	9.43	9.79	10.17	10.57	11.38	11.81	12.68	15.47	18.48
	80	9.10	9.28	9.96	10.36	10.78	11.21	12.11	12.58	13.54	16.63	19.96
400	5	4.17	4.11	4.24	4.33	4.44	4.55	4.78	4.90	5.14	5.86	6.58
	10	5.04	5.00	5.18	5.30	5.44	5.58	5.88	6.03	6.33	7.25	8.18
	20	6.21	6.19	6.45	6.62	6.81	7.00	7.39	7.60	8.01	9.27	10.56
	30	7.06	7.08	7.41	7.62	7.85	8.08	8.57	8.81	9.32	10.89	12.53
	40	7.77	7.81	8.21	8.46	8.73	9.00	9.57	9.86	10.46	12.32	14.30
	60	8.92	9.02	9.56	9.88	10.22	10.57	11.30	11.68	12.45	14.90	17.53
	70	9.42	9.55	10.15	10.51	10.89	11.28	12.09	12.50	13.36	16.10	19.05
	80	9.88	10.04	10.71	11.10	11.51	11.94	12.83	13.29	14.23	17.25	20.52

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 m (RADIUS = 9.9 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 0	5	2.51	2.62	2.97	3.15	3.34	3.52	3.91	4.10	4.49	5.66	6.86	
	10	3.04	3.30	3.85	4.13	4.41	4.69	5.26	5.54	6.11	7.84	9.61	
	20	3.94	4.43	5.34	5.79	6.23	6.66	7.53	7.97	8.84	11.50	14.22	
	30	4.73	5.42	6.65	7.24	7.82	8.39	9.53	10.09	11.24	14.71	18.27	
	40	5.46	6.33	7.85	8.57	9.28	9.97	11.36	12.05	13.43	17.65	21.99	
	60	6.79	8.00	10.05	11.01	11.95	12.87	14.71	15.63	17.46	23.05	28.79	
	70	7.41	8.78	11.08	12.15	13.20	14.23	16.28	17.30	19.34	25.57	31.97	
	80	8.01	9.54	12.08	13.25	14.40	15.54	17.79	18.91	21.16	28.00	35.00	
10	5	3.02	3.03	3.27	3.42	3.58	3.75	4.11	4.29	4.66	5.80	6.98	
	10	3.56	3.67	4.12	4.37	4.62	4.89	5.43	5.70	6.25	7.95	9.70	
	20	4.42	4.76	5.57	5.99	6.41	6.83	7.67	8.10	8.96	11.59	14.30	
	30	5.17	5.72	6.86	7.42	7.98	8.54	9.65	10.22	11.35	14.79	18.34	
	40	5.87	6.61	8.04	8.74	9.43	10.11	11.48	12.16	13.54	17.73	22.06	
	60	7.16	8.26	10.23	11.16	12.08	13.00	14.82	15.73	17.55	23.12	28.85	
	70	7.76	9.03	11.25	12.30	13.33	14.35	16.38	17.40	19.43	25.64	32.03	
	80	8.35	9.77	12.23	13.39	14.53	15.65	17.89	19.01	21.25	28.07	35.10	
20	5	3.32	3.30	3.51	3.65	3.80	3.96	4.29	4.47	4.82	5.93	7.09	
	10	3.91	3.98	4.36	4.59	4.83	5.08	5.59	5.86	6.40	8.07	9.80	
	20	4.81	5.06	5.79	6.18	6.58	6.99	7.82	8.24	9.08	11.69	14.39	
	30	5.56	6.01	7.06	7.59	8.14	8.68	9.78	10.34	11.45	14.88	18.42	
	40	6.25	6.88	8.23	8.90	9.58	10.25	11.60	12.27	13.64	17.81	22.12	
	60	7.52	8.50	10.40	11.31	12.22	13.12	14.93	15.83	17.65	23.19	28.92	
	70	8.11	9.27	11.41	12.44	13.46	14.47	16.48	17.49	19.52	25.71	32.09	
	80	8.69	10.00	12.39	13.53	14.66	15.77	17.99	19.10	21.33	28.14	35.16	
50	5	3.86	3.84	4.03	4.16	4.30	4.45	4.77	4.93	5.26	6.32	7.43	
	10	4.60	4.63	4.95	5.15	5.36	5.59	6.06	6.31	6.81	8.40	10.09	
	20	5.64	5.80	6.39	6.73	7.09	7.46	8.23	8.63	9.44	11.98	14.63	
	30	6.47	6.77	7.63	8.11	8.61	9.12	10.16	10.70	11.78	15.14	18.64	
	40	7.19	7.64	8.78	9.39	10.02	10.66	11.95	12.61	13.94	18.06	22.33	
	60	8.48	9.22	10.90	11.76	12.62	13.49	15.25	16.13	17.92	23.41	29.10	
	70	9.07	9.97	11.90	12.87	13.85	14.83	16.80	17.79	19.79	25.92	32.27	
	80	9.64	10.69	12.86	13.95	15.03	16.12	18.29	19.38	21.59	28.34	35.33	
100	5	4.44	4.40	4.59	4.72	4.86	5.02	5.33	5.50	5.83	6.87	7.94	
	10	5.33	5.33	5.64	5.83	6.04	6.25	6.70	6.94	7.42	8.94	10.56	
	20	6.56	6.67	7.19	7.50	7.83	8.17	8.88	9.25	10.02	12.45	15.03	
	30	7.50	7.72	8.46	8.89	9.34	9.81	10.78	11.28	12.31	15.57	19.01	
	40	8.31	8.64	9.61	10.16	10.73	11.32	12.53	13.16	14.44	18.46	22.67	
	60	9.70	10.27	11.70	12.48	13.28	14.10	15.78	16.64	18.37	23.78	29.41	
	70	10.33	11.01	12.68	13.57	14.49	15.41	17.31	18.27	20.22	26.27	32.57	
	80	10.92	11.73	13.63	14.63	15.65	16.69	18.79	19.85	22.01	28.68	35.62	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 m (RADIUS = 9.9 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 (m*s) ^{1/2}	5	4.85	4.81	5.00	5.14	5.28	5.44	5.76	5.93	6.27	7.32	8.39	
	10	5.86	5.86	6.15	6.35	6.55	6.77	7.22	7.45	7.93	9.42	11.01	
	20	7.23	7.32	7.82	8.12	8.43	8.77	9.46	9.81	10.55	12.91	15.43	
	30	8.27	8.45	9.15	9.56	9.98	10.43	11.35	11.84	12.83	15.99	19.37	
	40	9.16	9.43	10.33	10.84	11.38	11.93	13.09	13.70	14.93	18.85	23.01	
	60	10.65	11.13	12.44	13.16	13.92	14.69	16.30	17.13	18.83	24.14	29.72	
	70	11.32	11.90	13.42	14.25	15.11	15.99	17.82	18.75	20.66	26.62	32.87	
	80	11.94	12.63	14.36	15.29	16.26	17.25	19.28	20.32	22.43	29.02	35.91	
200	5	5.19	5.14	5.33	5.48	5.63	5.79	6.12	6.29	6.64	7.70	8.78	
	10	6.29	6.28	6.58	6.77	6.98	7.20	7.66	7.89	8.37	9.86	11.43	
	20	7.78	7.86	8.34	8.64	8.96	9.28	9.96	10.32	11.04	13.35	15.82	
	30	8.91	9.07	9.74	10.13	10.55	10.98	11.88	12.35	13.32	16.41	19.73	
	40	9.85	10.10	10.95	11.45	11.96	12.50	13.63	14.21	15.41	19.25	23.35	
	60	11.44	11.87	13.10	13.79	14.51	15.26	16.81	17.62	19.27	24.50	30.03	
	70	12.15	12.66	14.09	14.88	15.70	16.55	18.31	19.22	21.09	26.97	33.17	
	80	12.80	13.42	15.03	15.92	16.85	17.80	19.77	20.78	22.85	29.36	36.20	
250	5	5.48	5.42	5.62	5.77	5.92	6.09	6.43	6.60	6.96	8.04	9.13	
	10	6.66	6.64	6.95	7.14	7.36	7.58	8.04	8.28	8.76	10.26	11.82	
	20	8.26	8.32	8.80	9.10	9.41	9.74	10.42	10.77	11.49	13.77	16.21	
	30	9.45	9.60	10.25	10.64	11.05	11.48	12.37	12.83	13.78	16.82	20.09	
	40	10.45	10.68	11.51	11.99	12.50	13.02	14.12	14.69	15.87	19.64	23.69	
	60	12.13	12.52	13.70	14.37	15.07	15.80	17.31	18.09	19.71	24.86	30.34	
	70	12.87	13.34	14.70	15.46	16.26	17.08	18.80	19.69	21.52	27.31	33.46	
	80	13.55	14.11	15.66	16.51	17.41	18.33	20.24	21.23	23.27	29.69	36.48	
300	5	5.73	5.67	5.88	6.03	6.19	6.35	6.70	6.88	7.24	8.34	9.45	
	10	6.99	6.97	7.27	7.47	7.69	7.92	8.38	8.62	9.11	10.62	12.18	
	20	8.68	8.73	9.21	9.51	9.83	10.15	10.83	11.18	11.90	14.16	16.58	
	30	9.94	10.07	10.72	11.11	11.51	11.94	12.82	13.28	14.22	17.21	20.44	
	40	10.99	11.19	12.01	12.49	12.99	13.51	14.59	15.15	16.31	20.02	24.02	
	60	12.74	13.10	14.26	14.91	15.59	16.30	17.78	18.55	20.14	25.21	30.64	
	70	13.51	13.95	15.27	16.01	16.79	17.59	19.27	20.14	21.94	27.66	33.76	
	80	14.22	14.75	16.24	17.07	17.94	18.84	20.71	21.68	23.68	30.02	36.77	
400	5	6.17	6.11	6.32	6.47	6.64	6.82	7.18	7.36	7.74	8.87	10.01	
	10	7.55	7.53	7.84	8.05	8.27	8.50	8.98	9.23	9.73	11.26	12.84	
	20	9.40	9.45	9.93	10.23	10.55	10.88	11.57	11.92	12.64	14.90	17.28	
	30	10.78	10.89	11.53	11.92	12.33	12.75	13.63	14.09	15.02	17.96	21.13	
	40	11.92	12.10	12.90	13.37	13.86	14.38	15.45	16.00	17.13	20.76	24.68	
	60	13.81	14.13	15.24	15.88	16.54	17.23	18.68	19.42	20.96	25.91	31.25	
	70	14.63	15.03	16.29	17.01	17.76	18.54	20.17	21.01	22.75	28.34	34.34	
	80	15.40	15.87	17.29	18.09	18.93	19.79	21.60	22.54	24.48	30.69	37.34	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 m (RADIUS = 9.9 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE		CEILING HEIGHT, m											
(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24			
0	5	3.84	4.13	4.80	5.14	5.48	5.82	6.50	6.85	7.54	9.64	11.79			
	10	4.91	5.48	6.57	7.11	7.63	8.16	9.21	9.73	10.79	14.00	17.28			
	20	6.71	7.75	9.56	10.42	11.26	12.09	13.76	14.59	16.25	21.31	26.52			
	30	8.29	9.73	12.17	13.32	14.44	15.54	17.74	18.84	21.04	27.73	34.61			
	40	9.74	11.55	14.58	15.98	17.36	18.71	21.40	22.75	25.44	33.62	42.04			
	60	12.40	14.89	18.98	20.86	22.70	24.52	28.11	29.90	33.49	44.41	55.66			
	70	13.64	16.45	21.03	23.14	25.20	27.23	31.24	33.25	37.25	49.46	62.02			
	80	14.84	17.96	23.02	25.34	27.61	29.85	34.27	36.47	40.89	54.32	68.16			
10	5	4.45	4.58	5.11	5.41	5.73	6.05	6.70	7.04	7.71	9.78	11.91			
	10	5.47	5.87	6.84	7.34	7.85	8.35	9.38	9.89	10.93	14.11	17.38			
	20	7.20	8.08	9.78	10.61	11.44	12.26	13.90	14.72	16.37	21.41	26.60			
	30	8.74	10.03	12.38	13.50	14.60	15.69	17.87	18.96	21.15	27.82	34.68			
	40	10.16	11.83	14.77	16.15	17.51	18.85	21.52	22.86	25.54	33.70	42.11			
	60	12.77	15.15	19.15	21.01	22.84	24.64	28.22	30.00	33.58	44.49	55.72			
	70	14.00	16.70	21.20	23.29	25.33	27.35	31.35	33.34	37.34	49.53	62.08			
	80	15.19	18.20	23.18	25.48	27.74	29.96	34.37	36.57	40.97	54.39	68.21			
20	5	4.87	4.95	5.40	5.68	5.97	6.27	6.90	7.22	7.88	9.92	12.02			
	10	5.94	6.24	7.10	7.57	8.06	8.55	9.55	10.05	11.08	14.22	17.48			
	20	7.66	8.40	10.00	10.81	11.62	12.42	14.04	14.85	16.49	21.51	26.68			
	30	9.17	10.33	12.58	13.68	14.76	15.84	18.00	19.08	21.26	27.90	34.76			
	40	10.56	12.11	14.96	16.32	17.66	18.99	21.64	22.97	25.64	33.78	42.18			
	60	13.14	15.40	19.32	21.16	22.97	24.77	28.33	30.11	33.67	44.56	55.78			
	70	14.36	16.94	21.36	23.43	25.46	27.47	31.45	33.44	37.43	49.60	62.14			
	80	15.53	18.43	23.34	25.62	27.86	30.08	34.47	36.66	41.06	54.46	68.27			
50	5	5.69	5.72	6.10	6.35	6.61	6.88	7.46	7.76	8.37	10.32	12.37			
	10	6.93	7.11	7.82	8.23	8.66	9.11	10.04	10.52	11.50	14.57	17.77			
	20	8.78	9.30	10.66	11.39	12.14	12.91	14.46	15.25	16.85	21.80	26.93			
	30	10.31	11.18	13.18	14.21	15.24	16.28	18.38	19.44	21.59	28.17	34.98			
	40	11.69	12.92	15.52	16.81	18.11	19.40	22.00	23.31	25.95	34.03	42.39			
	60	14.21	16.14	19.83	21.61	23.38	25.14	28.65	30.41	33.95	44.78	55.97			
	70	15.40	17.66	21.85	23.87	25.85	27.83	31.76	33.74	37.70	49.81	62.32			
	80	16.55	19.13	23.81	26.04	28.24	30.43	34.77	36.95	41.32	54.66	68.45			
100	5	6.56	6.56	6.92	7.15	7.41	7.67	8.22	8.51	9.10	10.95	12.93			
	10	8.02	8.14	8.76	9.14	9.54	9.95	10.81	11.26	12.18	15.12	18.25			
	20	10.11	10.49	11.65	12.30	12.99	13.69	15.16	15.91	17.45	22.27	27.33			
	30	11.76	12.42	14.13	15.07	16.02	17.01	19.02	20.04	22.13	28.60	35.35			
	40	13.21	14.16	16.43	17.62	18.84	20.08	22.59	23.87	26.45	34.43	42.73			
	60	15.79	17.34	20.67	22.36	24.05	25.76	29.19	30.92	34.41	45.14	56.28			
	70	16.97	18.82	22.66	24.58	26.50	28.42	32.28	34.22	38.14	50.16	62.62			
	80	18.11	20.26	24.60	26.74	28.87	31.00	35.27	37.42	41.74	55.00	68.74			

282

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 m (RADIUS = 9.9 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 (m*s) ^{1/2}	5	7.19	7.18	7.53	7.77	8.02	8.29	8.84	9.12	9.70	11.53	13.46	
	10	8.82	8.92	9.51	9.87	10.26	10.66	11.50	11.93	12.82	15.67	18.72	
	20	11.11	11.43	12.50	13.11	13.76	14.43	15.82	16.54	18.03	22.74	27.74	
	30	12.89	13.45	15.01	15.88	16.78	17.71	19.64	20.63	22.66	29.03	35.72	
	40	14.43	15.23	17.29	18.41	19.56	20.75	23.18	24.42	26.95	34.83	43.07	
	60	17.10	18.43	21.48	23.09	24.72	26.37	29.72	31.42	34.86	45.51	56.59	
	70	18.32	19.91	23.46	25.29	27.14	29.01	32.80	34.71	38.58	50.51	62.92	
	80	19.48	21.34	25.37	27.43	29.49	31.57	35.77	37.89	42.17	55.34	69.03	
200	5	7.70	7.68	8.04	8.28	8.53	8.80	9.36	9.64	10.23	12.05	13.96	
	10	9.48	9.56	10.14	10.50	10.88	11.27	12.10	12.53	13.40	16.20	19.19	
	20	11.94	12.22	13.24	13.84	14.46	15.10	16.45	17.15	18.60	23.21	28.14	
	30	13.83	14.33	15.80	16.62	17.49	18.38	20.25	21.21	23.19	29.46	36.08	
	40	15.45	16.17	18.09	19.16	20.26	21.40	23.76	24.97	27.45	35.23	43.42	
	60	18.24	19.42	22.27	23.80	25.37	26.97	30.25	31.92	35.32	45.87	56.90	
	70	19.49	20.91	24.23	25.99	27.78	29.60	33.31	35.19	39.02	50.86	63.21	
	80	20.68	22.35	26.13	28.10	30.11	32.14	36.27	38.36	42.59	55.68	69.31	
250	5	8.14	8.12	8.48	8.72	8.98	9.25	9.81	10.10	10.69	12.52	14.42	
	10	10.04	10.11	10.68	11.04	11.42	11.82	12.64	13.07	13.94	16.69	19.64	
	20	12.66	12.91	13.90	14.48	15.09	15.72	17.05	17.73	19.15	23.68	28.54	
	30	14.65	15.10	16.51	17.31	18.15	19.02	20.83	21.78	23.71	29.88	36.45	
	40	16.34	17.00	18.84	19.86	20.93	22.03	24.33	25.51	27.94	35.63	43.76	
	60	19.23	20.32	23.03	24.50	26.01	27.57	30.78	32.42	35.77	46.23	57.21	
	70	20.53	21.83	24.98	26.67	28.40	30.18	33.82	35.67	39.45	51.21	63.51	
	80	21.75	23.28	26.87	28.77	30.72	32.71	36.76	38.82	43.01	56.02	69.60	
300	5	8.53	8.50	8.86	9.11	9.37	9.65	10.22	10.51	11.11	12.95	14.85	
	10	10.54	10.60	11.17	11.53	11.91	12.31	13.13	13.56	14.43	17.17	20.09	
	20	13.29	13.53	14.50	15.07	15.67	16.30	17.60	18.28	19.67	24.13	28.94	
	30	15.38	15.80	17.17	17.95	18.77	19.62	21.40	22.32	24.22	30.30	36.81	
	40	17.14	17.75	19.53	20.52	21.56	22.64	24.88	26.04	28.43	36.03	44.10	
	60	20.13	21.15	23.74	25.16	26.64	28.16	31.30	32.91	36.22	46.59	57.52	
	70	21.46	22.68	25.70	27.33	29.02	30.75	34.32	36.15	39.89	51.56	63.81	
	80	22.72	24.15	27.58	29.43	31.32	33.27	37.25	39.29	43.43	56.36	69.89	
400	5	9.21	9.16	9.54	9.79	10.06	10.35	10.93	11.23	11.84	13.72	15.64	
	10	11.41	11.45	12.02	12.39	12.77	13.18	14.01	14.44	15.31	18.04	20.92	
	20	14.40	14.60	15.55	16.12	16.72	17.33	18.62	19.28	20.65	25.01	29.72	
	30	16.65	17.02	18.34	19.10	19.90	20.73	22.46	23.36	25.20	31.14	37.53	
	40	18.53	19.08	20.78	21.73	22.74	23.77	25.94	27.07	29.39	36.81	44.77	
	60	21.72	22.62	25.07	26.42	27.83	29.29	32.32	33.89	37.11	47.31	58.13	
	70	23.12	24.21	27.04	28.59	30.21	31.87	35.32	37.10	40.75	52.25	64.40	
	80	24.44	25.72	28.93	30.68	32.50	34.36	38.22	40.21	44.27	57.03	70.46	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.5 m (RADIUS = 10.3 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
0	5	1.22	1.22	1.31	1.37	1.44	1.50	1.63	1.70	1.84	2.25	2.67	
	10	1.36	1.40	1.54	1.63	1.71	1.80	1.98	2.07	2.25	2.80	3.36	
	20	1.59	1.69	1.93	2.05	2.18	2.30	2.56	2.69	2.95	3.73	4.53	
	30	1.80	1.94	2.26	2.42	2.59	2.75	3.07	3.23	3.56	4.55	5.56	
	40	1.99	2.18	2.57	2.77	2.96	3.15	3.54	3.73	4.12	5.30	6.50	
	60	2.33	2.61	3.14	3.39	3.65	3.90	4.40	4.65	5.15	6.67	8.23	
	70	2.49	2.81	3.40	3.69	3.97	4.24	4.80	5.07	5.63	7.31	9.04	
	80	2.64	3.01	3.66	3.97	4.28	4.58	5.18	5.49	6.09	7.93	9.81	
10	5	1.53	1.49	1.55	1.59	1.64	1.70	1.81	1.87	2.00	2.38	2.78	
	10	1.71	1.69	1.78	1.84	1.91	1.99	2.14	2.23	2.39	2.92	3.46	
	20	1.97	1.98	2.14	2.25	2.35	2.47	2.70	2.82	3.07	3.83	4.62	
	30	2.17	2.23	2.46	2.60	2.75	2.89	3.20	3.35	3.67	4.64	5.64	
	40	2.36	2.45	2.76	2.93	3.11	3.29	3.66	3.85	4.22	5.38	6.57	
	60	2.68	2.86	3.31	3.54	3.78	4.02	4.50	4.75	5.24	6.74	8.29	
	70	2.84	3.05	3.57	3.83	4.10	4.36	4.90	5.17	5.72	7.38	9.10	
	80	2.98	3.24	3.82	4.11	4.40	4.70	5.28	5.58	6.18	8.00	9.87	
20	5	1.67	1.62	1.68	1.72	1.77	1.83	1.94	2.00	2.12	2.50	2.89	
	10	1.88	1.85	1.93	1.99	2.06	2.13	2.28	2.36	2.52	3.03	3.56	
	20	2.18	2.18	2.32	2.41	2.51	2.62	2.84	2.95	3.19	3.93	4.70	
	30	2.41	2.44	2.64	2.77	2.90	3.04	3.33	3.47	3.78	4.72	5.71	
	40	2.61	2.67	2.94	3.09	3.26	3.43	3.78	3.96	4.32	5.46	6.64	
	60	2.96	3.08	3.48	3.69	3.92	4.15	4.61	4.85	5.33	6.82	8.35	
	70	3.12	3.28	3.73	3.98	4.23	4.48	5.01	5.27	5.81	7.45	9.16	
	80	3.27	3.46	3.97	4.25	4.53	4.81	5.39	5.68	6.26	8.07	9.93	
50	5	1.91	1.86	1.92	1.97	2.02	2.08	2.20	2.26	2.38	2.76	3.15	
	10	2.19	2.16	2.24	2.30	2.37	2.44	2.59	2.66	2.82	3.31	3.82	
	20	2.58	2.56	2.69	2.78	2.87	2.97	3.18	3.28	3.50	4.20	4.94	
	30	2.86	2.87	3.05	3.16	3.28	3.40	3.67	3.80	4.08	4.98	5.93	
	40	3.11	3.14	3.36	3.50	3.64	3.79	4.11	4.28	4.62	5.70	6.85	
	60	3.52	3.59	3.91	4.10	4.29	4.50	4.93	5.15	5.60	7.04	8.54	
	70	3.70	3.80	4.16	4.38	4.60	4.83	5.31	5.56	6.07	7.66	9.34	
	80	3.87	3.99	4.41	4.64	4.89	5.15	5.68	5.96	6.52	8.27	10.11	
100	5	2.16	2.11	2.17	2.22	2.28	2.34	2.46	2.53	2.66	3.06	3.46	
	10	2.52	2.48	2.56	2.62	2.69	2.77	2.92	3.00	3.17	3.67	4.18	
	20	2.99	2.97	3.09	3.18	3.28	3.38	3.58	3.69	3.91	4.59	5.31	
	30	3.34	3.34	3.50	3.61	3.73	3.85	4.11	4.24	4.52	5.37	6.28	
	40	3.64	3.65	3.85	3.99	4.12	4.27	4.57	4.73	5.06	6.08	7.18	
	60	4.12	4.17	4.46	4.63	4.81	5.00	5.40	5.61	6.03	7.39	8.85	
	70	4.33	4.40	4.73	4.92	5.12	5.34	5.78	6.01	6.49	8.01	9.63	
	80	4.53	4.62	4.98	5.20	5.42	5.66	6.15	6.40	6.93	8.61	10.39	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.5 m (RADIUS = 10.3 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
150 (m*s) ^{1/2}	5	2.34	2.29	2.35	2.41	2.47	2.53	2.66	2.73	2.87	3.28	3.70
	10	2.75	2.71	2.79	2.86	2.93	3.01	3.17	3.26	3.43	3.94	4.46
	20	3.29	3.26	3.39	3.48	3.58	3.68	3.89	4.00	4.23	4.92	5.63
	30	3.69	3.68	3.85	3.96	4.07	4.20	4.46	4.59	4.86	5.71	6.61
	40	4.02	4.03	4.23	4.36	4.50	4.64	4.95	5.10	5.42	6.43	7.50
	60	4.57	4.60	4.88	5.05	5.22	5.41	5.80	6.00	6.42	7.74	9.15
	70	4.80	4.85	5.16	5.35	5.55	5.76	6.19	6.41	6.87	8.35	9.93
	80	5.02	5.09	5.43	5.64	5.86	6.09	6.56	6.81	7.31	8.94	10.68
200	5	2.49	2.44	2.50	2.56	2.62	2.68	2.82	2.89	3.03	3.46	3.89
	10	2.94	2.89	2.98	3.05	3.13	3.21	3.38	3.46	3.64	4.17	4.70
	20	3.54	3.51	3.63	3.73	3.83	3.93	4.15	4.26	4.49	5.19	5.91
	30	3.97	3.96	4.12	4.24	4.36	4.48	4.75	4.88	5.16	6.02	6.91
	40	4.33	4.33	4.53	4.67	4.81	4.95	5.26	5.42	5.74	6.74	7.80
	60	4.93	4.96	5.23	5.39	5.57	5.76	6.15	6.35	6.76	8.06	9.45
	70	5.18	5.23	5.53	5.72	5.91	6.12	6.55	6.77	7.22	8.66	10.21
	80	5.42	5.48	5.81	6.02	6.23	6.46	6.93	7.17	7.67	9.25	10.96
250	5	2.61	2.56	2.63	2.68	2.75	2.81	2.96	3.03	3.18	3.62	4.06
	10	3.10	3.05	3.14	3.22	3.30	3.38	3.55	3.64	3.82	4.37	4.91
	20	3.74	3.71	3.84	3.94	4.04	4.15	4.37	4.49	4.72	5.43	6.16
	30	4.22	4.20	4.36	4.48	4.60	4.73	5.00	5.14	5.42	6.28	7.18
	40	4.60	4.60	4.80	4.93	5.08	5.23	5.54	5.70	6.02	7.03	8.08
	60	5.24	5.26	5.53	5.70	5.88	6.06	6.45	6.65	7.06	8.35	9.73
	70	5.51	5.55	5.85	6.03	6.23	6.44	6.86	7.08	7.54	8.96	10.49
	80	5.76	5.81	6.15	6.35	6.56	6.79	7.25	7.49	7.99	9.55	11.23
300	5	2.72	2.67	2.74	2.80	2.86	2.93	3.08	3.15	3.30	3.76	4.21
	10	3.24	3.20	3.29	3.36	3.44	3.53	3.71	3.80	3.98	4.54	5.10
	20	3.93	3.89	4.03	4.12	4.23	4.34	4.57	4.69	4.92	5.65	6.39
	30	4.43	4.41	4.58	4.69	4.82	4.95	5.23	5.37	5.65	6.53	7.42
	40	4.84	4.83	5.04	5.17	5.32	5.47	5.78	5.94	6.27	7.29	8.34
	60	5.51	5.53	5.80	5.97	6.15	6.34	6.73	6.93	7.34	8.63	9.99
	70	5.80	5.83	6.13	6.32	6.52	6.72	7.15	7.37	7.83	9.25	10.76
	80	6.07	6.11	6.44	6.65	6.86	7.09	7.55	7.79	8.28	9.84	11.50
400	5	2.91	2.86	2.93	2.99	3.06	3.13	3.29	3.36	3.52	4.00	4.46
	10	3.49	3.44	3.54	3.61	3.70	3.79	3.97	4.07	4.26	4.84	5.42
	20	4.25	4.21	4.35	4.45	4.56	4.67	4.91	5.03	5.28	6.03	6.79
	30	4.80	4.77	4.95	5.07	5.20	5.34	5.62	5.76	6.06	6.95	7.87
	40	5.25	5.24	5.44	5.58	5.73	5.89	6.21	6.38	6.72	7.75	8.82
	60	5.99	6.00	6.27	6.44	6.63	6.82	7.22	7.42	7.84	9.14	10.49
	70	6.30	6.32	6.63	6.82	7.02	7.23	7.66	7.89	8.34	9.76	11.26
	80	6.59	6.63	6.96	7.17	7.38	7.61	8.08	8.32	8.82	10.36	12.00

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.5 m (RADIUS = 10.3 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		°C	1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2} 0	5	1.75	1.79	1.96	2.06	2.17	2.28	2.50	2.50	2.61	2.84	3.52	4.21
	10	2.03	2.13	2.42	2.57	2.72	2.88	3.19	3.19	3.35	3.66	4.63	5.61
	20	2.50	2.72	3.19	3.42	3.65	3.89	4.35	4.35	4.59	5.06	6.49	7.95
	30	2.90	3.23	3.86	4.17	4.47	4.77	5.37	5.37	5.68	6.28	8.12	10.00
	40	3.28	3.70	4.48	4.85	5.22	5.58	6.31	6.31	6.67	7.40	9.62	11.89
	60	3.96	4.56	5.61	6.10	6.59	7.07	8.03	8.03	8.50	9.46	12.36	15.34
	70	4.29	4.96	6.14	6.69	7.23	7.77	8.83	8.83	9.36	10.42	13.64	16.95
	80	4.59	5.35	6.65	7.25	7.85	8.44	9.60	9.60	10.18	11.34	14.88	18.51
10	5	2.17	2.13	2.24	2.32	2.41	2.50	2.70	2.70	2.80	3.01	3.66	4.33
	10	2.47	2.48	2.68	2.80	2.93	3.07	3.36	3.36	3.51	3.81	4.74	5.70
	20	2.93	3.04	3.41	3.62	3.83	4.05	4.50	4.50	4.72	5.18	6.58	8.03
	30	3.32	3.53	4.06	4.35	4.63	4.92	5.50	5.50	5.80	6.39	8.21	10.08
	40	3.68	3.98	4.67	5.02	5.37	5.72	6.43	6.43	6.79	7.51	9.70	11.96
	60	4.33	4.82	5.78	6.26	6.73	7.20	8.14	8.14	8.61	9.55	12.43	15.40
	70	4.64	5.21	6.30	6.84	7.36	7.89	8.93	8.93	9.46	10.51	13.71	17.01
	80	4.94	5.59	6.81	7.40	7.98	8.55	9.70	9.70	10.28	11.43	14.95	18.57
20	5	2.37	2.33	2.43	2.50	2.59	2.68	2.86	2.86	2.96	3.16	3.79	4.44
	10	2.72	2.72	2.89	3.00	3.12	3.25	3.52	3.52	3.66	3.95	4.86	5.80
	20	3.24	3.30	3.62	3.81	4.01	4.21	4.64	4.64	4.86	5.30	6.68	8.11
	30	3.65	3.79	4.26	4.52	4.79	5.07	5.63	5.63	5.92	6.50	8.29	10.15
	40	4.02	4.24	4.85	5.18	5.52	5.86	6.55	6.55	6.90	7.61	9.78	12.03
	60	4.67	5.06	5.95	6.41	6.86	7.32	8.24	8.24	8.71	9.64	12.51	15.46
	70	4.98	5.45	6.47	6.98	7.49	8.01	9.04	9.04	9.56	10.60	13.79	17.07
	80	5.27	5.82	6.97	7.54	8.10	8.67	9.80	9.80	10.37	11.52	15.02	18.63
50	5	2.74	2.69	2.79	2.86	2.95	3.04	3.22	3.22	3.32	3.52	4.13	4.76
	10	3.20	3.17	3.33	3.43	3.55	3.67	3.92	3.92	4.06	4.33	5.18	6.09
	20	3.83	3.86	4.12	4.29	4.46	4.65	5.04	5.04	5.24	5.65	6.97	8.36
	30	4.31	4.40	4.78	5.00	5.24	5.49	6.01	6.01	6.28	6.82	8.55	10.37
	40	4.73	4.87	5.37	5.65	5.95	6.26	6.91	6.91	7.24	7.91	10.02	12.23
	60	5.45	5.71	6.44	6.85	7.26	7.69	8.57	8.57	9.01	9.92	12.73	15.65
	70	5.77	6.09	6.95	7.41	7.88	8.36	9.35	9.35	9.85	10.86	14.00	17.25
	80	6.08	6.46	7.44	7.95	8.48	9.02	10.11	10.11	10.66	11.78	15.22	18.80
100	5	3.12	3.07	3.17	3.25	3.34	3.43	3.62	3.62	3.72	3.93	4.55	5.19
	10	3.69	3.66	3.81	3.91	4.03	4.15	4.41	4.41	4.54	4.81	5.65	6.53
	20	4.46	4.47	4.71	4.87	5.04	5.22	5.59	5.59	5.78	6.17	7.42	8.76
	30	5.03	5.09	5.43	5.63	5.86	6.09	6.57	6.57	6.82	7.33	8.98	10.74
	40	5.52	5.62	6.05	6.31	6.58	6.86	7.46	7.46	7.77	8.40	10.42	12.58
	60	6.34	6.53	7.15	7.51	7.89	8.28	9.09	9.09	9.51	10.37	13.09	15.96
	70	6.70	6.94	7.66	8.07	8.50	8.94	9.86	9.86	10.33	11.30	14.35	17.56
	80	7.04	7.32	8.15	8.61	9.08	9.58	10.60	10.60	11.13	12.20	15.56	19.09

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.5 m (RADIUS = 10.3 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 150	°C												
	5	3.40	3.35	3.45	3.53	3.62	3.72	3.92	4.02	4.23	4.88	5.52	
	10	4.05	4.01	4.16	4.27	4.39	4.52	4.78	4.91	5.19	6.03	6.91	
	20	4.92	4.91	5.16	5.31	5.48	5.66	6.03	6.22	6.61	7.84	9.14	
	30	5.56	5.60	5.93	6.13	6.35	6.57	7.04	7.29	7.79	9.39	11.10	
	40	6.10	6.18	6.59	6.84	7.10	7.38	7.95	8.25	8.86	10.81	12.91	
	60	7.00	7.16	7.74	8.08	8.44	8.81	9.58	9.98	10.81	13.45	16.27	
	70	7.40	7.59	8.26	8.65	9.05	9.47	10.34	10.80	11.73	14.70	17.85	
200	80	7.77	8.00	8.76	9.19	9.64	10.11	11.08	11.58	12.62	15.90	19.38	
	5	3.63	3.57	3.67	3.76	3.85	3.95	4.16	4.27	4.49	5.15	5.81	
	10	4.34	4.29	4.45	4.56	4.69	4.81	5.08	5.22	5.50	6.36	7.24	
	20	5.29	5.28	5.52	5.68	5.85	6.03	6.40	6.59	6.99	8.21	9.50	
	30	5.99	6.02	6.34	6.55	6.76	6.99	7.46	7.70	8.19	9.77	11.45	
	40	6.58	6.64	7.04	7.29	7.55	7.82	8.38	8.68	9.28	11.19	13.25	
	60	7.55	7.68	8.24	8.57	8.92	9.28	10.03	10.42	11.23	13.81	16.58	
	70	7.97	8.14	8.78	9.15	9.55	9.95	10.80	11.24	12.14	15.04	18.15	
250	80	8.37	8.57	9.29	9.71	10.14	10.59	11.53	12.02	13.02	16.24	19.67	
	5	3.82	3.76	3.87	3.96	4.05	4.16	4.37	4.48	4.70	5.38	6.05	
	10	4.58	4.54	4.70	4.81	4.94	5.07	5.35	5.49	5.77	6.65	7.54	
	20	5.61	5.59	5.84	6.00	6.17	6.35	6.73	6.92	7.32	8.55	9.83	
	30	6.36	6.38	6.70	6.91	7.12	7.35	7.82	8.06	8.56	10.12	11.78	
	40	6.99	7.04	7.44	7.68	7.94	8.21	8.77	9.06	9.66	11.55	13.57	
	60	8.02	8.14	8.69	9.01	9.35	9.71	10.45	10.83	11.62	14.16	16.88	
	70	8.47	8.62	9.24	9.61	9.99	10.39	11.22	11.65	12.54	15.38	18.44	
300	80	8.88	9.07	9.77	10.17	10.60	11.04	11.96	12.43	13.42	16.57	19.96	
	5	3.99	3.93	4.04	4.13	4.23	4.33	4.55	4.67	4.90	5.59	6.28	
	10	4.80	4.76	4.92	5.04	5.16	5.30	5.58	5.72	6.02	6.91	7.81	
	20	5.89	5.87	6.12	6.28	6.46	6.64	7.02	7.22	7.62	8.85	10.14	
	30	6.69	6.70	7.02	7.23	7.45	7.68	8.15	8.39	8.89	10.45	12.10	
	40	7.35	7.39	7.79	8.03	8.29	8.56	9.13	9.42	10.01	11.89	13.89	
	60	8.44	8.55	9.09	9.41	9.75	10.10	10.83	11.21	12.00	14.49	17.18	
	70	8.91	9.05	9.66	10.02	10.40	10.79	11.61	12.04	12.91	15.71	18.74	
400	80	9.34	9.52	10.20	10.60	11.02	11.45	12.36	12.83	13.79	16.89	20.24	
	5	4.28	4.22	4.33	4.43	4.53	4.64	4.87	4.99	5.23	5.95	6.66	
	10	5.18	5.13	5.30	5.42	5.55	5.70	5.99	6.14	6.44	7.36	8.29	
	20	6.38	6.35	6.60	6.77	6.95	7.14	7.54	7.74	8.15	9.40	10.70	
	30	7.25	7.26	7.58	7.79	8.02	8.25	8.73	8.98	9.48	11.05	12.69	
	40	7.97	8.01	8.40	8.65	8.91	9.19	9.76	10.05	10.64	12.51	14.49	
	60	9.16	9.25	9.78	10.11	10.44	10.80	11.53	11.90	12.68	15.13	17.77	
	70	9.67	9.79	10.39	10.75	11.13	11.52	12.33	12.75	13.61	16.35	19.31	
80	10.14	10.30	10.96	11.35	11.77	12.20	13.09	13.55	14.49	17.53	20.80		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.5 m (RADIUS = 10.3 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
0	5	2.59	2.70	3.04	3.23	3.42	3.61	3.99	4.18	4.57	5.75	6.95
	10	3.14	3.40	3.96	4.24	4.52	4.81	5.37	5.66	6.23	7.96	9.73
	20	4.07	4.57	5.49	5.94	6.38	6.82	7.70	8.14	9.01	11.68	14.42
	30	4.89	5.59	6.84	7.43	8.01	8.59	9.74	10.31	11.46	14.95	18.52
	40	5.64	6.53	8.07	8.80	9.51	10.21	11.61	12.31	13.70	17.94	22.29
	60	7.01	8.25	10.34	11.31	12.25	13.19	15.04	15.96	17.81	23.43	29.20
	70	7.65	9.06	11.40	12.48	13.54	14.58	16.64	17.67	19.73	25.99	32.43
	80	8.27	9.84	12.42	13.61	14.77	15.92	18.19	19.32	21.59	28.47	35.54
10	5	3.11	3.12	3.35	3.50	3.67	3.84	4.19	4.37	4.74	5.89	7.07
	10	3.66	3.78	4.22	4.48	4.74	5.00	5.54	5.82	6.37	8.08	9.83
	20	4.55	4.90	5.72	6.14	6.56	6.99	7.84	8.27	9.14	11.78	14.50
	30	5.33	5.89	7.04	7.61	8.18	8.74	9.87	10.43	11.57	15.03	18.60
	40	6.05	6.81	8.27	8.97	9.66	10.35	11.73	12.42	13.81	18.02	22.36
	60	7.39	8.51	10.51	11.46	12.39	13.31	15.15	16.07	17.91	23.50	29.26
	70	8.02	9.31	11.56	12.63	13.67	14.70	16.75	17.77	19.82	26.07	32.49
	80	8.62	10.07	12.58	13.75	14.90	16.04	18.29	19.42	21.67	28.54	35.60
20	5	3.41	3.40	3.60	3.74	3.89	4.05	4.38	4.55	4.91	6.02	7.18
	10	4.02	4.09	4.47	4.70	4.94	5.19	5.71	5.98	6.52	8.19	9.93
	20	4.95	5.21	5.94	6.34	6.74	7.15	7.98	8.41	9.26	11.88	14.58
	30	5.73	6.19	7.25	7.79	8.34	8.89	10.00	10.56	11.68	15.12	18.67
	40	6.44	7.09	8.46	9.14	9.81	10.49	11.85	12.54	13.91	18.11	22.43
	60	7.75	8.76	10.68	11.61	12.53	13.44	15.26	16.17	18.00	23.58	29.33
	70	8.37	9.55	11.73	12.77	13.80	14.82	16.85	17.87	19.91	26.14	32.55
	80	8.97	10.31	12.74	13.89	15.03	16.15	18.39	19.51	21.76	28.61	35.66
50	5	3.98	3.94	4.12	4.25	4.40	4.55	4.86	5.02	5.36	6.41	7.52
	10	4.73	4.75	5.07	5.27	5.49	5.71	6.18	6.43	6.93	8.53	10.22
	20	5.80	5.96	6.55	6.90	7.26	7.63	8.41	8.80	9.62	12.17	14.83
	30	6.65	6.96	7.83	8.32	8.82	9.33	10.38	10.92	12.01	15.38	18.90
	40	7.40	7.85	9.01	9.63	10.26	10.91	12.21	12.87	14.21	18.35	22.64
	60	8.73	9.49	11.19	12.06	12.94	13.82	15.59	16.48	18.28	23.80	29.51
	70	9.34	10.26	12.22	13.21	14.19	15.18	17.17	18.17	20.18	26.35	32.73
	80	9.93	11.00	13.21	14.31	15.41	16.50	18.70	19.80	22.02	28.81	35.83
100	5	4.56	4.51	4.70	4.83	4.97	5.12	5.44	5.60	5.93	6.97	8.04
	10	5.48	5.48	5.77	5.96	6.17	6.39	6.84	7.07	7.55	9.07	10.70
	20	6.74	6.85	7.36	7.67	8.00	8.35	9.06	9.44	10.20	12.64	15.24
	30	7.71	7.93	8.68	9.11	9.56	10.03	11.00	11.51	12.55	15.82	19.27
	40	8.55	8.88	9.86	10.41	10.98	11.57	12.80	13.43	14.72	18.76	22.99
	60	9.98	10.55	12.01	12.79	13.60	14.43	16.12	16.99	18.74	24.17	29.83
	70	10.63	11.32	13.01	13.92	14.84	15.78	17.69	18.66	20.62	26.71	33.03
	80	11.24	12.06	13.99	15.01	16.04	17.08	19.20	20.28	22.45	29.16	36.13

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.5 m (RADIUS = 10.3 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		(m*s) ^{1/2}	1	2	4	5	6	7	9	10	12	18	24
150	5		4.99	4.93	5.12	5.25	5.40	5.55	5.88	6.04	6.38	7.42	8.50
	10		6.02	6.01	6.30	6.49	6.70	6.91	7.36	7.60	8.07	9.57	11.15
	20		7.43	7.51	8.01	8.31	8.62	8.95	9.65	10.01	10.75	13.11	15.64
	30		8.50	8.68	9.37	9.78	10.21	10.66	11.59	12.07	13.07	16.25	19.64
	40		9.41	9.68	10.59	11.10	11.64	12.20	13.37	13.97	15.22	19.16	23.33
	60		10.95	11.43	12.75	13.49	14.25	15.03	16.65	17.49	19.19	24.53	30.14
	70		11.64	12.22	13.76	14.60	15.47	16.36	18.20	19.14	21.06	27.06	33.33
	80		12.28	12.98	14.73	15.67	16.65	17.65	19.70	20.75	22.88	29.50	36.42
200	5		5.33	5.27	5.46	5.60	5.75	5.91	6.24	6.41	6.75	7.81	8.89
	10		6.46	6.44	6.73	6.93	7.14	7.35	7.81	8.04	8.52	10.01	11.58
	20		8.00	8.06	8.54	8.84	9.15	9.48	10.16	10.52	11.24	13.55	16.04
	30		9.15	9.30	9.97	10.37	10.79	11.22	12.13	12.60	13.57	16.67	20.00
	40		10.12	10.36	11.22	11.72	12.24	12.78	13.91	14.49	15.70	19.56	23.67
	60		11.76	12.19	13.43	14.12	14.85	15.60	17.17	17.98	19.64	24.90	30.45
	70		12.48	13.00	14.44	15.24	16.07	16.93	18.71	19.62	21.50	27.41	33.63
	80		13.16	13.78	15.41	16.31	17.24	18.20	20.19	21.21	23.30	29.84	36.71
250	5		5.63	5.56	5.76	5.90	6.05	6.21	6.55	6.72	7.08	8.15	9.25
	10		6.84	6.82	7.11	7.31	7.52	7.74	8.20	8.43	8.91	10.41	11.97
	20		8.48	8.54	9.01	9.31	9.62	9.95	10.63	10.98	11.70	13.98	16.42
	30		9.71	9.85	10.50	10.89	11.30	11.73	12.62	13.08	14.04	17.08	20.36
	40		10.74	10.96	11.79	12.27	12.78	13.31	14.41	14.99	16.17	19.95	24.01
	60		12.46	12.85	14.04	14.71	15.42	16.15	17.67	18.46	20.09	25.26	30.76
	70		13.22	13.69	15.07	15.84	16.64	17.47	19.20	20.09	21.93	27.76	33.93
	80		13.93	14.49	16.05	16.91	17.81	18.74	20.68	21.67	23.72	30.18	37.00
300	5		5.89	5.82	6.02	6.16	6.32	6.48	6.83	7.01	7.37	8.46	9.57
	10		7.18	7.15	7.44	7.64	7.86	8.08	8.55	8.78	9.27	10.78	12.34
	20		8.91	8.96	9.43	9.73	10.04	10.37	11.05	11.40	12.12	14.38	16.80
	30		10.21	10.33	10.97	11.36	11.77	12.19	13.08	13.54	14.48	17.48	20.72
	40		11.29	11.49	12.30	12.78	13.28	13.80	14.89	15.45	16.61	20.34	24.35
	60		13.09	13.45	14.60	15.26	15.95	16.66	18.15	18.93	20.52	25.62	31.07
	70		13.88	14.32	15.65	16.39	17.18	17.99	19.68	20.55	22.36	28.11	34.23
	80		14.61	15.14	16.64	17.48	18.35	19.26	21.15	22.12	24.13	30.51	37.29
400	5		6.34	6.27	6.47	6.62	6.78	6.96	7.31	7.50	7.87	9.00	10.14
	10		7.76	7.72	8.02	8.22	8.45	8.68	9.16	9.40	9.90	11.43	13.01
	20		9.66	9.69	10.16	10.46	10.78	11.11	11.80	12.15	12.87	15.13	17.51
	30		11.07	11.17	11.80	12.19	12.60	13.02	13.90	14.36	15.29	18.24	21.42
	40		12.24	12.41	13.20	13.68	14.17	14.68	15.76	16.31	17.45	21.09	25.02
	60		14.18	14.50	15.61	16.25	16.92	17.61	19.06	19.81	21.36	26.33	31.68
	70		15.03	15.42	16.69	17.41	18.17	18.95	20.58	21.43	23.18	28.79	34.86
	80		15.81	16.28	17.71	18.51	19.36	20.23	22.05	23.00	24.95	31.18	37.86

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.5 m (RADIUS = 10.3 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX
TEMPERATURE RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C	1	2	4	5	6	7	9	10	12	18	24
0	5	3.97	4.26	4.93	5.27	5.61	5.95	6.64	6.99	7.68	9.79	11.95
	10	5.08	5.65	6.75	7.29	7.82	8.35	9.41	9.94	11.00	14.22	17.52
	20	6.94	7.99	9.83	10.69	11.54	12.39	14.06	14.90	16.57	21.66	26.89
	30	8.57	10.04	12.52	13.67	14.81	15.92	18.14	19.25	21.46	28.19	35.10
	40	10.07	11.92	14.99	16.41	17.80	19.17	21.89	23.24	25.95	34.18	42.64
	60	12.81	15.36	19.52	21.43	23.29	25.12	28.75	30.55	34.17	45.16	56.45
	70	14.10	16.97	21.63	23.77	25.85	27.90	31.95	33.97	38.01	50.29	62.90
	80	15.34	18.53	23.67	26.03	28.32	30.58	35.05	37.27	41.72	55.24	69.13
10	5	4.59	4.72	5.25	5.55	5.87	6.19	6.85	7.18	7.86	9.93	12.07
	10	5.64	6.04	7.02	7.53	8.04	8.55	9.58	10.10	11.14	14.34	17.62
	20	7.43	8.32	10.05	10.89	11.73	12.55	14.21	15.03	16.70	21.76	26.97
	30	9.02	10.34	12.72	13.86	14.97	16.07	18.27	19.37	21.57	28.28	35.17
	40	10.49	12.20	15.18	16.58	17.95	19.31	22.01	23.36	26.05	34.26	42.71
	60	13.19	15.62	19.69	21.58	23.43	25.25	28.86	30.66	34.26	45.23	56.51
	70	14.46	17.22	21.80	23.92	25.98	28.02	32.06	34.07	38.10	50.36	62.97
	80	15.69	18.77	23.83	26.17	28.45	30.70	35.15	37.37	41.81	55.30	69.19
20	5	5.02	5.09	5.54	5.82	6.11	6.42	7.05	7.37	8.03	10.07	12.18
	10	6.12	6.41	7.29	7.76	8.25	8.75	9.75	10.26	11.29	14.45	17.72
	20	7.89	8.65	10.28	11.09	11.91	12.72	14.35	15.17	16.82	21.86	27.05
	30	9.45	10.64	12.93	14.04	15.13	16.22	18.40	19.49	21.68	28.37	35.25
	40	10.90	12.48	15.37	16.75	18.11	19.45	22.13	23.47	26.16	34.35	42.78
	60	13.57	15.87	19.86	21.73	23.56	25.37	28.97	30.76	34.36	45.30	56.58
	70	14.82	17.46	21.96	24.06	26.12	28.14	32.17	34.17	38.19	50.43	63.03
	80	16.04	19.00	24.00	26.31	28.58	30.82	35.25	37.46	41.89	55.37	69.25
50	5	5.85	5.87	6.25	6.50	6.76	7.03	7.61	7.91	8.52	10.47	12.53
	10	7.13	7.31	8.01	8.43	8.86	9.31	10.25	10.73	11.72	14.80	18.01
	20	9.03	9.56	10.94	11.68	12.44	13.21	14.78	15.57	17.18	22.15	27.30
	30	10.61	11.51	13.53	14.57	15.62	16.67	18.79	19.86	22.01	28.63	35.47
	40	12.04	13.30	15.94	17.25	18.56	19.87	22.49	23.81	26.46	34.59	42.99
	60	14.65	16.63	20.38	22.19	23.97	25.75	29.29	31.07	34.64	45.53	56.76
	70	15.88	18.19	22.46	24.50	26.51	28.51	32.48	34.47	38.46	50.64	63.21
	80	17.06	19.71	24.48	26.74	28.96	31.17	35.56	37.75	42.15	55.58	69.43
100	5	6.74	6.73	7.09	7.32	7.57	7.83	8.39	8.67	9.26	11.12	13.09
	10	8.25	8.36	8.98	9.35	9.75	10.17	11.03	11.48	12.41	15.36	18.49
	20	10.39	10.77	11.94	12.60	13.29	14.00	15.48	16.24	17.78	22.63	27.71
	30	12.10	12.77	14.50	15.44	16.41	17.40	19.43	20.46	22.56	29.07	35.84
	40	13.60	14.56	16.86	18.07	19.30	20.55	23.09	24.38	26.97	35.00	43.33
	60	16.25	17.84	21.22	22.94	24.65	26.37	29.84	31.58	35.10	45.90	57.08
	70	17.48	19.37	23.28	25.22	27.17	29.11	33.00	34.96	38.91	51.00	63.51
	80	18.65	20.86	25.27	27.44	29.60	31.75	36.06	38.23	42.58	55.92	69.72

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.5 m (RADIUS = 10.3 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 (m*s) ^{1/2}	5	7.39	7.37	7.71	7.95	8.20	8.46	9.01	9.30	9.88	11.70	13.63	
	10	9.07	9.15	9.74	10.10	10.49	10.89	11.73	12.16	13.06	15.91	18.97	
	20	11.42	11.74	12.81	13.43	14.08	14.75	16.15	16.88	18.37	23.11	28.12	
	30	13.25	13.81	15.39	16.26	17.18	18.11	20.06	21.06	23.10	29.50	36.22	
	40	14.84	15.65	17.74	18.87	20.04	21.23	23.68	24.93	27.48	35.41	43.68	
	60	17.59	18.95	22.05	23.68	25.32	26.99	30.38	32.09	35.56	46.26	57.39	
	70	18.85	20.48	24.08	25.94	27.82	29.71	33.52	35.45	39.35	51.35	63.81	
	80	20.04	21.95	26.05	28.13	30.23	32.33	36.57	38.70	43.01	56.27	70.00	
200	5	7.92	7.88	8.23	8.47	8.72	8.99	9.54	9.83	10.41	12.23	14.14	
	10	9.74	9.81	10.38	10.74	11.12	11.51	12.34	12.77	13.65	16.44	19.45	
	20	12.27	12.54	13.57	14.16	14.79	15.44	16.79	17.50	18.95	23.58	28.53	
	30	14.22	14.71	16.19	17.02	17.90	18.80	20.67	21.65	23.64	29.93	36.59	
	40	15.88	16.60	18.55	19.63	20.74	21.89	24.27	25.49	27.99	35.81	44.03	
	60	18.75	19.95	22.85	24.40	25.99	27.61	30.91	32.60	36.02	46.63	57.71	
	70	20.04	21.50	24.87	26.65	28.46	30.30	34.04	35.94	39.79	51.71	64.11	
	80	21.27	22.97	26.82	28.82	30.85	32.91	37.07	39.18	43.44	56.61	70.30	
250	5	8.37	8.33	8.68	8.92	9.17	9.44	10.00	10.29	10.88	12.71	14.61	
	10	10.32	10.37	10.94	11.30	11.67	12.07	12.89	13.32	14.19	16.95	19.91	
	20	13.00	13.25	14.24	14.82	15.43	16.07	17.40	18.08	19.50	24.05	28.93	
	30	15.05	15.50	16.92	17.73	18.57	19.44	21.27	22.22	24.16	30.36	36.95	
	40	16.79	17.45	19.31	20.34	21.42	22.53	24.84	26.04	28.48	36.21	44.37	
	60	19.77	20.87	23.62	25.10	26.64	28.21	31.45	33.10	36.47	47.00	58.02	
	70	21.10	22.43	25.63	27.34	29.09	30.89	34.56	36.43	40.23	52.06	64.42	
	80	22.36	23.92	27.57	29.50	31.47	33.48	37.57	39.65	43.87	56.95	70.59	
300	5	8.77	8.72	9.07	9.31	9.58	9.85	10.42	10.71	11.30	13.14	15.05	
	10	10.83	10.87	11.44	11.79	12.17	12.57	13.39	13.82	14.69	17.43	20.35	
	20	13.66	13.88	14.85	15.42	16.03	16.65	17.96	18.64	20.04	24.51	29.33	
	30	15.80	16.21	17.59	18.38	19.20	20.06	21.84	22.77	24.68	30.79	37.32	
	40	17.61	18.22	20.01	21.01	22.06	23.14	25.40	26.57	28.98	36.61	44.71	
	60	20.69	21.72	24.35	25.78	27.27	28.80	31.97	33.60	36.93	47.36	58.33	
	70	22.06	23.30	26.36	28.01	29.72	31.46	35.07	36.91	40.67	52.41	64.72	
	80	23.35	24.81	28.29	30.16	32.08	34.04	38.07	40.12	44.30	57.29	70.89	
400	5	9.46	9.40	9.76	10.01	10.28	10.56	11.14	11.44	12.05	13.92	15.84	
	10	11.72	11.74	12.31	12.67	13.05	13.45	14.28	14.71	15.58	18.31	21.20	
	20	14.79	14.98	15.93	16.49	17.09	17.70	18.99	19.66	21.03	25.40	30.13	
	30	17.10	17.46	18.78	19.55	20.35	21.18	22.92	23.82	25.68	31.63	38.05	
	40	19.04	19.58	21.28	22.25	23.25	24.30	26.48	27.61	29.95	37.41	45.40	
	60	22.31	23.22	25.69	27.06	28.48	29.95	33.01	34.59	37.83	48.09	58.95	
	70	23.76	24.86	27.72	29.29	30.92	32.60	36.08	37.87	41.54	53.11	65.32	
	80	25.11	26.41	29.67	31.44	33.27	35.15	39.05	41.05	45.14	57.97	71.47	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 15.0 m (RADIUS = 10.6 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	5	1.26	1.26	1.35	1.41	1.47	1.53	1.66	1.73	1.87	2.28	2.70	
	10	1.41	1.44	1.58	1.67	1.75	1.84	2.02	2.11	2.29	2.84	3.40	
	20	1.65	1.74	1.98	2.10	2.23	2.36	2.61	2.74	3.00	3.79	4.59	
	30	1.86	2.00	2.32	2.49	2.65	2.81	3.13	3.30	3.62	4.62	5.63	
	40	2.05	2.24	2.64	2.84	3.03	3.23	3.61	3.81	4.20	5.38	6.59	
	60	2.40	2.69	3.22	3.48	3.73	3.99	4.49	4.74	5.25	6.78	8.34	
	70	2.57	2.90	3.49	3.78	4.06	4.34	4.90	5.18	5.74	7.43	9.16	
	80	2.73	3.10	3.76	4.07	4.38	4.69	5.30	5.60	6.21	8.06	9.95	
10	5	1.58	1.53	1.58	1.63	1.68	1.73	1.85	1.91	2.03	2.42	2.81	
	10	1.76	1.73	1.82	1.88	1.95	2.03	2.19	2.27	2.43	2.96	3.50	
	20	2.02	2.04	2.20	2.30	2.41	2.52	2.76	2.88	3.12	3.89	4.68	
	30	2.24	2.29	2.53	2.67	2.81	2.96	3.27	3.42	3.74	4.71	5.71	
	40	2.42	2.52	2.83	3.01	3.18	3.37	3.74	3.92	4.30	5.46	6.66	
	60	2.76	2.94	3.40	3.63	3.87	4.11	4.60	4.85	5.34	6.85	8.40	
	70	2.92	3.14	3.66	3.93	4.20	4.47	5.01	5.28	5.83	7.50	9.22	
	80	3.07	3.33	3.92	4.21	4.51	4.81	5.40	5.70	6.30	8.13	10.01	
20	5	1.71	1.67	1.72	1.76	1.81	1.87	1.98	2.04	2.16	2.54	2.92	
	10	1.93	1.90	1.98	2.04	2.11	2.18	2.33	2.41	2.57	3.07	3.60	
	20	2.24	2.24	2.38	2.47	2.57	2.67	2.89	3.01	3.24	3.98	4.76	
	30	2.48	2.51	2.71	2.83	2.97	3.10	3.39	3.54	3.85	4.80	5.78	
	40	2.68	2.74	3.01	3.17	3.33	3.50	3.86	4.04	4.40	5.55	6.73	
	60	3.04	3.17	3.56	3.78	4.01	4.24	4.71	4.95	5.43	6.92	8.47	
	70	3.20	3.37	3.82	4.07	4.33	4.59	5.11	5.38	5.92	7.57	9.28	
	80	3.36	3.56	4.08	4.35	4.64	4.92	5.50	5.79	6.38	8.20	10.07	
50	5	1.96	1.91	1.96	2.01	2.06	2.12	2.24	2.30	2.42	2.80	3.19	
	10	2.25	2.21	2.29	2.35	2.42	2.49	2.64	2.71	2.87	3.36	3.87	
	20	2.65	2.63	2.75	2.84	2.93	3.03	3.24	3.34	3.56	4.26	5.00	
	30	2.94	2.95	3.12	3.23	3.35	3.48	3.74	3.88	4.16	5.05	6.01	
	40	3.19	3.22	3.44	3.58	3.72	3.87	4.19	4.36	4.70	5.79	6.94	
	60	3.61	3.69	4.01	4.19	4.39	4.60	5.03	5.25	5.71	7.15	8.66	
	70	3.80	3.90	4.27	4.48	4.70	4.94	5.42	5.67	6.18	7.78	9.46	
	80	3.97	4.10	4.52	4.75	5.01	5.26	5.80	6.08	6.64	8.40	10.24	
100	5	2.22	2.17	2.22	2.27	2.33	2.38	2.51	2.57	2.71	3.10	3.50	
	10	2.58	2.54	2.62	2.68	2.75	2.82	2.98	3.06	3.22	3.72	4.23	
	20	3.07	3.04	3.17	3.25	3.35	3.45	3.65	3.76	3.98	4.66	5.37	
	30	3.43	3.42	3.59	3.69	3.81	3.93	4.19	4.32	4.59	5.45	6.36	
	40	3.73	3.74	3.94	4.07	4.21	4.36	4.66	4.82	5.14	6.18	7.28	
	60	4.23	4.28	4.56	4.73	4.92	5.11	5.51	5.71	6.14	7.51	8.97	
	70	4.45	4.51	4.84	5.03	5.24	5.45	5.90	6.13	6.61	8.13	9.76	
	80	4.65	4.74	5.10	5.31	5.54	5.78	6.27	6.53	7.06	8.74	10.54	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 15.0 m (RADIUS = 10.6 m)
FIRE GROWTH: ULTRAFast (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
150 (m*s) ^{1/2}	5	2.41	2.35	2.41	2.46	2.52	2.58	2.71	2.78	2.91	3.33	3.74	
	10	2.82	2.78	2.86	2.92	2.99	3.07	3.23	3.32	3.48	4.00	4.52	
	20	3.38	3.35	3.47	3.56	3.65	3.76	3.97	4.08	4.30	4.99	5.70	
	30	3.79	3.77	3.93	4.04	4.16	4.28	4.54	4.68	4.95	5.80	6.69	
	40	4.13	4.13	4.33	4.45	4.59	4.74	5.04	5.20	5.52	6.53	7.60	
	60	4.69	4.72	4.99	5.16	5.34	5.52	5.91	6.12	6.53	7.85	9.27	
	70	4.93	4.98	5.28	5.47	5.67	5.88	6.31	6.54	7.00	8.47	10.06	
	80	5.15	5.22	5.56	5.77	5.99	6.21	6.69	6.94	7.45	9.07	10.82	
200	5	2.56	2.50	2.56	2.61	2.67	2.74	2.87	2.94	3.08	3.51	3.94	
	10	3.02	2.97	3.05	3.12	3.19	3.27	3.44	3.53	3.70	4.23	4.76	
	20	3.63	3.59	3.72	3.81	3.91	4.01	4.23	4.34	4.57	5.27	5.98	
	30	4.08	4.06	4.22	4.33	4.45	4.58	4.84	4.97	5.25	6.10	6.99	
	40	4.45	4.44	4.64	4.77	4.91	5.06	5.36	5.52	5.84	6.84	7.91	
	60	5.06	5.08	5.35	5.51	5.69	5.88	6.27	6.47	6.88	8.18	9.57	
	70	5.32	5.36	5.66	5.84	6.04	6.25	6.67	6.89	7.35	8.80	10.35	
	80	5.56	5.61	5.95	6.15	6.37	6.59	7.06	7.30	7.80	9.39	11.11	
250	5	2.68	2.63	2.69	2.74	2.80	2.87	3.01	3.08	3.23	3.67	4.11	
	10	3.18	3.13	3.22	3.29	3.36	3.45	3.62	3.71	3.88	4.43	4.97	
	20	3.84	3.80	3.93	4.02	4.12	4.23	4.45	4.57	4.80	5.51	6.24	
	30	4.33	4.30	4.46	4.58	4.70	4.83	5.10	5.23	5.51	6.37	7.27	
	40	4.72	4.71	4.91	5.04	5.18	5.33	5.64	5.80	6.12	7.13	8.19	
	60	5.38	5.39	5.66	5.82	6.00	6.19	6.58	6.78	7.19	8.48	9.85	
	70	5.66	5.68	5.98	6.17	6.36	6.57	7.00	7.22	7.67	9.10	10.63	
	80	5.91	5.96	6.29	6.49	6.71	6.93	7.39	7.63	8.13	9.70	11.38	
300	5	2.80	2.74	2.80	2.86	2.92	2.99	3.13	3.21	3.36	3.81	4.26	
	10	3.33	3.28	3.36	3.44	3.51	3.60	3.78	3.87	4.05	4.60	5.16	
	20	4.03	3.99	4.12	4.21	4.32	4.43	4.65	4.77	5.01	5.73	6.47	
	30	4.55	4.52	4.68	4.80	4.92	5.05	5.32	5.46	5.75	6.62	7.52	
	40	4.97	4.95	5.15	5.28	5.43	5.58	5.89	6.05	6.38	7.39	8.45	
	60	5.66	5.67	5.93	6.10	6.28	6.47	6.86	7.06	7.47	8.76	10.12	
	70	5.95	5.98	6.27	6.46	6.66	6.86	7.29	7.51	7.96	9.39	10.90	
	80	6.23	6.26	6.59	6.79	7.01	7.23	7.70	7.94	8.43	9.99	11.65	
400	5	2.99	2.93	3.00	3.06	3.12	3.20	3.35	3.42	3.58	4.05	4.52	
	10	3.58	3.53	3.62	3.69	3.78	3.86	4.05	4.14	4.33	4.91	5.49	
	20	4.36	4.31	4.45	4.54	4.65	4.77	5.00	5.12	5.37	6.12	6.87	
	30	4.92	4.89	5.06	5.18	5.31	5.44	5.72	5.87	6.16	7.06	7.97	
	40	5.39	5.36	5.57	5.71	5.85	6.01	6.33	6.50	6.83	7.86	8.93	
	60	6.14	6.14	6.41	6.58	6.77	6.96	7.36	7.56	7.98	9.27	10.63	
	70	6.47	6.48	6.78	6.97	7.17	7.37	7.81	8.03	8.49	9.91	11.41	
	80	6.76	6.79	7.12	7.32	7.54	7.77	8.23	8.48	8.97	10.52	12.16	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 15.0 m (RADIUS = 10.6 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	5	1.81	1.84	2.01	2.12	2.22	2.33	2.55	2.66	2.89	3.57	4.27	
	10	2.09	2.20	2.48	2.63	2.79	2.94	3.26	3.41	3.73	4.70	5.68	
	20	2.57	2.80	3.27	3.51	3.74	3.98	4.45	4.68	5.15	6.59	8.05	
	30	3.00	3.33	3.96	4.27	4.58	4.88	5.49	5.79	6.40	8.25	10.14	
	40	3.38	3.81	4.60	4.97	5.35	5.71	6.45	6.81	7.55	9.77	12.05	
	60	4.09	4.70	5.76	6.26	6.75	7.24	8.20	8.68	9.64	12.56	15.55	
	70	4.42	5.12	6.31	6.86	7.41	7.95	9.02	9.55	10.62	13.86	17.19	
	80	4.74	5.52	6.83	7.44	8.04	8.64	9.81	10.40	11.57	15.12	18.77	
10	5	2.23	2.19	2.30	2.37	2.46	2.55	2.75	2.85	3.06	3.71	4.38	
	10	2.54	2.55	2.74	2.87	3.00	3.14	3.43	3.58	3.88	4.81	5.78	
	20	3.02	3.12	3.50	3.71	3.92	4.14	4.59	4.82	5.28	6.69	8.14	
	30	3.42	3.63	4.17	4.45	4.74	5.03	5.62	5.92	6.51	8.34	10.21	
	40	3.79	4.09	4.79	5.14	5.50	5.86	6.57	6.93	7.65	9.85	12.12	
	60	4.47	4.96	5.94	6.42	6.89	7.37	8.31	8.78	9.74	12.63	15.61	
	70	4.79	5.36	6.47	7.01	7.54	8.07	9.13	9.65	10.71	13.94	17.25	
	80	5.09	5.75	6.99	7.59	8.17	8.76	9.91	10.49	11.66	15.19	18.83	
20	5	2.44	2.39	2.48	2.56	2.64	2.73	2.92	3.01	3.21	3.84	4.50	
	10	2.80	2.79	2.96	3.07	3.19	3.32	3.59	3.73	4.02	4.93	5.88	
	20	3.33	3.39	3.71	3.90	4.10	4.31	4.73	4.95	5.40	6.78	8.22	
	30	3.75	3.90	4.37	4.63	4.90	5.18	5.75	6.04	6.62	8.42	10.29	
	40	4.13	4.36	4.98	5.31	5.65	5.99	6.69	7.04	7.75	9.94	12.19	
	60	4.81	5.21	6.11	6.57	7.03	7.49	8.42	8.89	9.83	12.71	15.68	
	70	5.12	5.60	6.64	7.16	7.68	8.19	9.23	9.75	10.80	14.01	17.31	
	80	5.43	5.99	7.15	7.73	8.30	8.87	10.02	10.59	11.74	15.26	18.88	
50	5	2.82	2.76	2.85	2.93	3.01	3.10	3.28	3.38	3.58	4.19	4.82	
	10	3.29	3.26	3.40	3.51	3.62	3.74	4.00	4.13	4.40	5.26	6.16	
	20	3.93	3.96	4.22	4.39	4.56	4.75	5.14	5.34	5.75	7.07	8.47	
	30	4.43	4.51	4.89	5.12	5.36	5.61	6.13	6.40	6.95	8.69	10.51	
	40	4.86	5.00	5.50	5.79	6.09	6.40	7.05	7.38	8.06	10.18	12.40	
	60	5.60	5.86	6.61	7.01	7.44	7.87	8.75	9.20	10.11	12.93	15.87	
	70	5.93	6.26	7.12	7.59	8.07	8.56	9.55	10.05	11.07	14.22	17.49	
	80	6.25	6.64	7.63	8.15	8.68	9.22	10.32	10.88	12.00	15.47	19.06	
100	5	3.21	3.15	3.24	3.32	3.41	3.50	3.69	3.79	3.99	4.62	5.25	
	10	3.79	3.75	3.90	4.00	4.12	4.24	4.49	4.62	4.89	5.73	6.61	
	20	4.58	4.58	4.82	4.98	5.15	5.32	5.69	5.89	6.28	7.53	8.87	
	30	5.17	5.22	5.55	5.76	5.98	6.21	6.70	6.95	7.47	9.12	10.88	
	40	5.67	5.76	6.20	6.45	6.73	7.01	7.61	7.92	8.56	10.59	12.74	
	60	6.51	6.70	7.33	7.69	8.07	8.46	9.28	9.70	10.57	13.30	16.18	
	70	6.88	7.12	7.85	8.26	8.69	9.14	10.06	10.54	11.51	14.58	17.80	
	80	7.23	7.52	8.35	8.81	9.29	9.79	10.82	11.35	12.43	15.81	19.36	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 15.0 m (RADIUS = 10.6 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 150	°C												
	5	3.50	3.43	3.53	3.61	3.70	3.79	3.99	4.10	4.31	4.94	5.59	
	10	4.16	4.11	4.26	4.36	4.48	4.61	4.87	5.00	5.28	6.12	6.99	
	20	5.05	5.04	5.27	5.43	5.60	5.78	6.14	6.33	6.72	7.95	9.26	
	30	5.71	5.74	6.06	6.27	6.48	6.71	7.18	7.43	7.93	9.53	11.24	
	40	6.27	6.33	6.74	6.99	7.26	7.53	8.11	8.40	9.02	10.98	13.09	
	60	7.19	7.34	7.93	8.27	8.62	9.00	9.78	10.18	11.01	13.67	16.49	
	70	7.60	7.79	8.46	8.85	9.25	9.67	10.55	11.01	11.95	14.93	18.10	
200	80	7.97	8.21	8.97	9.40	9.86	10.33	11.31	11.81	12.85	16.16	19.65	
	5	3.73	3.66	3.76	3.84	3.93	4.03	4.24	4.35	4.56	5.22	5.88	
	10	4.45	4.40	4.55	4.66	4.78	4.91	5.18	5.32	5.59	6.45	7.33	
	20	5.43	5.41	5.65	5.81	5.98	6.15	6.52	6.72	7.11	8.33	9.62	
	30	6.15	6.17	6.49	6.69	6.91	7.13	7.60	7.84	8.34	9.91	11.60	
	40	6.75	6.81	7.21	7.45	7.71	7.98	8.55	8.84	9.44	11.36	13.42	
	60	7.75	7.88	8.44	8.77	9.12	9.48	10.23	10.63	11.43	14.02	16.81	
	70	8.18	8.35	8.99	9.36	9.76	10.16	11.01	11.46	12.37	15.28	18.40	
250	80	8.59	8.79	9.52	9.93	10.37	10.82	11.76	12.26	13.27	16.49	19.94	
	5	3.92	3.85	3.96	4.04	4.14	4.24	4.45	4.56	4.78	5.45	6.13	
	10	4.71	4.65	4.80	4.92	5.04	5.17	5.45	5.59	5.87	6.74	7.63	
	20	5.75	5.73	5.97	6.13	6.30	6.48	6.86	7.05	7.44	8.67	9.95	
	30	6.53	6.54	6.86	7.06	7.28	7.50	7.97	8.21	8.71	10.27	11.93	
	40	7.17	7.21	7.61	7.85	8.11	8.38	8.94	9.23	9.83	11.72	13.75	
	60	8.23	8.34	8.89	9.21	9.56	9.91	10.66	11.04	11.83	14.37	17.11	
	70	8.69	8.84	9.46	9.83	10.21	10.61	11.44	11.87	12.77	15.62	18.69	
300	80	9.12	9.30	10.00	10.41	10.83	11.27	12.20	12.68	13.66	16.83	20.23	
	5	4.10	4.03	4.13	4.22	4.32	4.42	4.64	4.75	4.98	5.67	6.35	
	10	4.93	4.88	5.03	5.15	5.27	5.41	5.68	5.83	6.12	7.01	7.91	
	20	6.04	6.02	6.26	6.42	6.59	6.78	7.16	7.35	7.75	8.98	10.27	
	30	6.86	6.87	7.18	7.39	7.61	7.83	8.31	8.55	9.05	10.61	12.26	
	40	7.54	7.58	7.97	8.21	8.47	8.74	9.30	9.59	10.19	12.07	14.07	
	60	8.66	8.76	9.30	9.62	9.96	10.31	11.05	11.43	12.21	14.72	17.42	
	70	9.14	9.28	9.88	10.25	10.62	11.02	11.84	12.27	13.15	15.96	18.99	
400	80	9.59	9.76	10.44	10.84	11.26	11.69	12.60	13.07	14.04	17.16	20.51	
	5	4.39	4.32	4.43	4.52	4.63	4.74	4.96	5.08	5.32	6.03	6.74	
	10	5.32	5.26	5.42	5.54	5.67	5.81	6.10	6.25	6.55	7.47	8.39	
	20	6.54	6.51	6.75	6.92	7.10	7.29	7.68	7.88	8.29	9.54	10.84	
	30	7.44	7.44	7.75	7.96	8.18	8.42	8.90	9.14	9.65	11.22	12.86	
	40	8.18	8.21	8.59	8.84	9.10	9.38	9.94	10.23	10.83	12.70	14.68	
	60	9.40	9.48	10.01	10.33	10.67	11.02	11.75	12.13	12.90	15.36	18.01	
	70	9.92	10.04	10.63	10.99	11.36	11.75	12.57	12.99	13.85	16.60	19.57	
80	10.41	10.55	11.22	11.61	12.02	12.45	13.34	13.80	14.76	17.80	21.08		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 15.0 m (RADIUS = 10.6 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
0 (m*s) ^{1/2}	5	2.67	2.78	3.12	3.31	3.50	3.69	4.07	4.26	4.65	5.83	7.04	
	10	3.24	3.50	4.06	4.35	4.63	4.92	5.48	5.77	6.34	8.08	9.86	
	20	4.20	4.70	5.64	6.09	6.54	6.98	7.86	8.30	9.19	11.87	14.61	
	30	5.05	5.76	7.02	7.62	8.21	8.79	9.95	10.53	11.68	15.19	18.78	
	40	5.82	6.73	8.30	9.03	9.75	10.46	11.86	12.57	13.97	18.23	22.60	
	60	7.24	8.51	10.62	11.60	12.56	13.50	15.37	16.30	18.16	23.81	29.61	
	70	7.90	9.34	11.71	12.81	13.87	14.93	17.01	18.05	20.12	26.42	32.88	
	80	8.54	10.14	12.76	13.97	15.14	16.30	18.59	19.73	22.01	28.94	36.04	
10	5	3.20	3.20	3.43	3.59	3.75	3.92	4.27	4.46	4.83	5.97	7.16	
	10	3.77	3.89	4.33	4.59	4.85	5.11	5.66	5.93	6.49	8.20	9.96	
	20	4.69	5.04	5.87	6.29	6.72	7.15	8.01	8.44	9.31	11.97	14.70	
	30	5.49	6.07	7.23	7.81	8.38	8.94	10.08	10.65	11.79	15.28	18.85	
	40	6.24	7.01	8.49	9.20	9.90	10.60	11.99	12.68	14.07	18.32	22.67	
	60	7.62	8.76	10.80	11.76	12.70	13.63	15.48	16.41	18.26	23.89	29.67	
	70	8.27	9.58	11.88	12.95	14.01	15.05	17.12	18.15	20.21	26.49	32.94	
	80	8.89	10.38	12.92	14.11	15.27	16.42	18.70	19.83	22.10	29.01	36.10	
20	5	3.51	3.49	3.69	3.83	3.98	4.13	4.47	4.64	5.00	6.11	7.27	
	10	4.14	4.21	4.58	4.81	5.06	5.31	5.83	6.09	6.64	8.32	10.06	
	20	5.09	5.36	6.09	6.49	6.90	7.31	8.15	8.58	9.43	12.07	14.78	
	30	5.90	6.36	7.44	7.99	8.54	9.10	10.21	10.77	11.90	15.36	18.93	
	40	6.64	7.29	8.68	9.37	10.05	10.74	12.11	12.80	14.18	18.40	22.74	
	60	7.99	9.02	10.97	11.91	12.84	13.76	15.59	16.51	18.35	23.96	29.73	
	70	8.63	9.83	12.05	13.10	14.14	15.17	17.22	18.25	20.30	26.56	33.00	
	80	9.24	10.62	13.08	14.25	15.40	16.54	18.80	19.93	22.19	29.08	36.16	
50	5	4.09	4.04	4.22	4.35	4.49	4.64	4.95	5.12	5.45	6.50	7.62	
	10	4.86	4.88	5.19	5.39	5.61	5.83	6.31	6.55	7.06	8.66	10.36	
	20	5.96	6.12	6.71	7.06	7.42	7.80	8.58	8.98	9.80	12.36	15.03	
	30	6.84	7.14	8.03	8.52	9.02	9.54	10.60	11.14	12.24	15.63	19.16	
	40	7.61	8.07	9.24	9.87	10.51	11.16	12.47	13.14	14.49	18.65	22.95	
	60	8.98	9.76	11.49	12.37	13.25	14.14	15.92	16.82	18.63	24.19	29.92	
	70	9.61	10.55	12.54	13.54	14.54	15.54	17.54	18.55	20.58	26.78	33.19	
	80	10.22	11.32	13.57	14.68	15.79	16.89	19.11	20.22	22.45	29.28	36.34	
100	5	4.69	4.63	4.80	4.93	5.08	5.23	5.54	5.70	6.03	7.07	8.14	
	10	5.63	5.62	5.91	6.10	6.30	6.52	6.97	7.20	7.68	9.21	10.84	
	20	6.92	7.02	7.54	7.85	8.18	8.52	9.25	9.62	10.39	12.84	15.44	
	30	7.92	8.14	8.89	9.32	9.77	10.25	11.23	11.74	12.78	16.07	19.53	
	40	8.78	9.11	10.10	10.65	11.23	11.83	13.07	13.70	15.00	19.06	23.30	
	60	10.26	10.83	12.31	13.11	13.93	14.76	16.47	17.34	19.10	24.56	30.24	
	70	10.92	11.63	13.35	14.26	15.19	16.14	18.07	19.04	21.02	27.14	33.49	
	80	11.55	12.39	14.35	15.38	16.42	17.48	19.62	20.70	22.89	29.63	36.63	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 15.0 m (RADIUS = 10.6 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
150	5	5.12	5.06	5.23	5.37	5.51	5.67	5.99	6.15	6.49	7.53	8.60	
	10	6.18	6.16	6.45	6.64	6.84	7.06	7.50	7.74	8.21	9.71	11.29	
	20	7.63	7.70	8.19	8.49	8.81	9.14	9.84	10.20	10.94	13.31	15.85	
	30	8.73	8.90	9.60	10.01	10.44	10.88	11.82	12.31	13.31	16.50	19.90	
	40	9.66	9.94	10.84	11.36	11.90	12.47	13.64	14.25	15.50	19.46	23.65	
	60	11.25	11.73	13.07	13.81	14.58	15.37	17.00	17.84	19.56	24.93	30.56	
	70	11.95	12.55	14.10	14.95	15.83	16.73	18.59	19.53	21.47	27.49	33.80	
	80	12.62	13.32	15.10	16.06	17.04	18.05	20.12	21.17	23.32	29.98	36.92	
200	5	5.48	5.41	5.59	5.72	5.87	6.03	6.35	6.52	6.87	7.92	9.01	
	10	6.64	6.61	6.89	7.08	7.29	7.50	7.96	8.19	8.67	10.16	11.72	
	20	8.21	8.27	8.74	9.04	9.35	9.68	10.36	10.71	11.44	13.76	16.25	
	30	9.40	9.54	10.21	10.60	11.02	11.46	12.37	12.84	13.81	16.93	20.27	
	40	10.39	10.63	11.49	11.99	12.51	13.05	14.19	14.78	15.99	19.86	24.00	
	60	12.08	12.50	13.75	14.46	15.19	15.95	17.53	18.34	20.01	25.30	30.87	
	70	12.82	13.34	14.79	15.60	16.44	17.30	19.10	20.02	21.91	27.85	34.10	
	80	13.51	14.14	15.79	16.70	17.64	18.61	20.62	21.64	23.74	30.32	37.22	
250	5	5.78	5.71	5.89	6.03	6.18	6.34	6.67	6.85	7.20	8.27	9.36	
	10	7.02	6.99	7.27	7.47	7.68	7.89	8.35	8.59	9.07	10.56	12.12	
	20	8.71	8.75	9.22	9.51	9.83	10.15	10.83	11.18	11.90	14.19	16.64	
	30	9.97	10.09	10.74	11.13	11.55	11.97	12.87	13.33	14.29	17.35	20.64	
	40	11.02	11.23	12.07	12.55	13.06	13.59	14.70	15.28	16.46	20.26	24.34	
	60	12.79	13.18	14.38	15.06	15.76	16.50	18.03	18.83	20.46	25.66	31.18	
	70	13.57	14.05	15.43	16.21	17.01	17.85	19.59	20.49	22.35	28.20	34.40	
	80	14.30	14.87	16.44	17.31	18.22	19.16	21.11	22.11	24.17	30.66	37.51	
300	5	6.05	5.97	6.15	6.30	6.45	6.61	6.96	7.13	7.49	8.58	9.69	
	10	7.37	7.33	7.61	7.81	8.02	8.24	8.71	8.94	9.43	10.93	12.50	
	20	9.15	9.18	9.65	9.94	10.25	10.58	11.26	11.61	12.33	14.60	17.02	
	30	10.48	10.59	11.23	11.61	12.02	12.45	13.33	13.79	14.74	17.75	21.00	
	40	11.59	11.78	12.59	13.07	13.57	14.09	15.18	15.75	16.92	20.65	24.68	
	60	13.44	13.79	14.95	15.61	16.30	17.02	18.52	19.30	20.90	26.02	31.50	
	70	14.25	14.68	16.02	16.77	17.56	18.38	20.08	20.96	22.78	28.55	34.70	
	80	15.00	15.53	17.04	17.89	18.77	19.68	21.58	22.57	24.59	31.00	37.80	
400	5	6.51	6.42	6.61	6.76	6.92	7.09	7.45	7.63	8.00	9.13	10.26	
	10	7.96	7.91	8.20	8.40	8.62	8.85	9.33	9.57	10.07	11.60	13.17	
	20	9.91	9.93	10.39	10.69	11.01	11.34	12.02	12.37	13.09	15.35	17.74	
	30	11.36	11.45	12.08	12.46	12.87	13.29	14.17	14.63	15.56	18.52	21.70	
	40	12.56	12.72	13.51	13.98	14.48	14.99	16.06	16.62	17.76	21.41	25.36	
	60	14.55	14.86	15.97	16.62	17.29	17.98	19.44	20.19	21.75	26.74	32.12	
	70	15.42	15.81	17.08	17.81	18.57	19.35	21.00	21.85	23.61	29.25	35.30	
	80	16.23	16.69	18.13	18.94	19.79	20.67	22.50	23.45	25.41	31.68	38.38	

SPACING = 15.0 m (RADIUS = 10.6 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

298

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 15.0 m (RADIUS = 10.6 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C												
150	5	7.59	7.55	7.89	8.12	8.37	8.64	9.18	9.47	10.05	11.87	13.81	
	10	9.31	9.39	9.97	10.33	10.72	11.12	11.96	12.39	13.29	16.16	19.23	
	20	11.73	12.04	13.12	13.74	14.39	15.07	16.48	17.21	18.72	23.47	28.50	
	30	13.61	14.18	15.77	16.65	17.57	18.52	20.48	21.49	23.54	29.97	36.72	
	40	15.24	16.07	18.18	19.33	20.51	21.71	24.19	25.45	28.01	35.98	44.29	
	60	18.08	19.46	22.62	24.26	25.93	27.62	31.03	32.76	36.25	47.02	58.20	
	70	19.37	21.04	24.71	26.59	28.49	30.40	34.25	36.20	40.12	52.19	64.71	
	80	20.61	22.56	26.73	28.84	30.96	33.09	37.37	39.52	43.86	57.19	71.00	
200	5	8.13	8.08	8.42	8.65	8.91	9.17	9.72	10.01	10.59	12.41	14.32	
	10	10.00	10.06	10.62	10.98	11.36	11.75	12.58	13.01	13.89	16.69	19.70	
	20	12.60	12.87	13.89	14.49	15.11	15.77	17.13	17.84	19.30	23.95	28.91	
	30	14.60	15.09	16.58	17.42	18.30	19.21	21.10	22.08	24.08	30.41	37.09	
	40	16.31	17.04	19.01	20.09	21.22	22.38	24.78	26.01	28.52	36.39	44.64	
	60	19.26	20.49	23.43	25.00	26.60	28.24	31.58	33.27	36.72	47.39	58.51	
	70	20.59	22.08	25.50	27.30	29.14	31.00	34.78	36.69	40.57	52.55	65.01	
	80	21.86	23.60	27.51	29.54	31.59	33.67	37.87	40.00	44.29	57.54	71.29	
250	5	8.59	8.54	8.88	9.11	9.37	9.63	10.19	10.48	11.07	12.89	14.79	
	10	10.59	10.63	11.19	11.55	11.92	12.32	13.14	13.57	14.44	17.21	20.17	
	20	13.35	13.59	14.58	15.16	15.77	16.41	17.74	18.43	19.86	24.43	29.32	
	30	15.45	15.90	17.33	18.14	18.99	19.87	21.71	22.66	24.62	30.85	37.46	
	40	17.24	17.91	19.78	20.82	21.91	23.03	25.36	26.56	29.03	36.79	44.99	
	60	20.31	21.42	24.21	25.71	27.26	28.85	32.11	33.78	37.18	47.76	58.83	
	70	21.68	23.03	26.27	28.00	29.78	31.59	35.30	37.18	41.01	52.91	65.32	
	80	22.97	24.57	28.27	30.22	32.22	34.25	38.38	40.47	44.73	57.88	71.59	
300	5	9.00	8.94	9.28	9.52	9.78	10.05	10.61	10.90	11.50	13.33	15.24	
	10	11.12	11.15	11.70	12.06	12.43	12.83	13.65	14.07	14.94	17.69	20.62	
	20	14.02	14.23	15.20	15.77	16.37	17.00	18.32	19.00	20.40	24.89	29.73	
	30	16.22	16.63	18.01	18.80	19.63	20.49	22.29	23.22	25.14	31.28	37.83	
	40	18.08	18.69	20.49	21.50	22.56	23.65	25.93	27.10	29.53	37.20	45.33	
	60	21.25	22.28	24.94	26.40	27.90	29.45	32.65	34.29	37.64	48.13	59.14	
	70	22.66	23.91	27.01	28.68	30.41	32.18	35.81	37.67	41.46	53.26	65.62	
	80	23.99	25.46	29.00	30.89	32.84	34.82	38.88	40.95	45.16	58.23	71.88	
400	5	9.71	9.64	9.98	10.23	10.49	10.77	11.35	11.65	12.26	14.12	16.04	
	10	12.02	12.03	12.59	12.95	13.33	13.73	14.55	14.98	15.85	18.59	21.48	
	20	15.17	15.35	16.29	16.86	17.45	18.07	19.36	20.03	21.41	25.80	30.53	
	30	17.55	17.90	19.23	19.99	20.80	21.63	23.38	24.28	26.15	32.13	38.57	
	40	19.54	20.08	21.79	22.76	23.77	24.82	27.02	28.16	30.50	38.00	46.02	
	60	22.90	23.82	26.32	27.70	29.13	30.61	33.69	35.28	38.55	48.87	59.77	
	70	24.39	25.50	28.40	29.98	31.63	33.32	36.83	38.64	42.34	53.97	66.23	
	80	25.78	27.10	30.40	32.19	34.04	35.94	39.87	41.89	46.01	58.92	72.47	

This page intentionally left blank.

APPENDIX D.

DETECTOR ACTIVATION TIME TABLES:
RATE OF TEMPERATURE RISE

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 m (RADIUS = 0.0 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	0.11*	0.19*	0.35*	0.43*	0.50*	0.57*	0.72*	0.79*	0.94*	1.39*	1.88*
	10	0.11*	0.20*	0.36*	0.44*	0.52*	0.60*	0.75*	0.83*	0.98*	1.48*	2.06*
	14	0.11*	0.21*	0.38*	0.47*	0.55*	0.64*	0.81*	0.90*	1.08*	1.68*	2.58*
100	8	0.12*	0.21*	0.39*	0.48*	0.56*	0.65*	0.82*	0.90*	1.07*	1.61*	2.19*
	10	0.12*	0.22*	0.41*	0.50*	0.59*	0.68*	0.86*	0.96*	1.14*	1.74*	2.43*
	14	0.13*	0.23*	0.44*	0.54*	0.64*	0.74*	0.95*	1.05*	1.27*	2.01*	3.01*
150	8	0.12*	0.23*	0.42*	0.52*	0.61*	0.71*	0.90*	0.99*	1.18*	1.78*	2.45*
	10	0.13*	0.24*	0.44*	0.55*	0.65*	0.75*	0.95*	1.06*	1.27*	1.94*	2.73*
	14	0.13*	0.25*	0.48*	0.60*	0.71*	0.83*	1.06*	1.18*	1.43*	2.27*	3.37*
200	8	0.13*	0.24*	0.45*	0.55*	0.66*	0.76*	0.96*	1.07*	1.28*	1.94*	2.67*
	10	0.13*	0.25*	0.47*	0.59*	0.70*	0.81*	1.03*	1.15*	1.38*	2.12*	2.98*
	14	0.14*	0.27*	0.52*	0.65*	0.77*	0.90*	1.16*	1.29*	1.57*	2.49*	3.69*
250	8	0.13*	0.25*	0.47*	0.58*	0.69*	0.80*	1.03*	1.14*	1.37*	2.08*	2.86*
	10	0.14*	0.26*	0.50*	0.62*	0.74*	0.86*	1.10*	1.23*	1.48*	2.28*	3.21*
	14	0.15*	0.29*	0.56*	0.69*	0.83*	0.96*	1.25*	1.39*	1.69*	2.70*	3.98*
300	8	0.14*	0.26*	0.50*	0.61*	0.73*	0.85*	1.08*	1.20*	1.44*	2.21*	3.05*
	10	0.15*	0.28*	0.53*	0.66*	0.78*	0.91*	1.17*	1.30*	1.57*	2.43*	3.42*
	14	0.16*	0.30*	0.59*	0.73*	0.88*	1.03*	1.33*	1.48*	1.80*	2.88*	4.25*
350	8	0.14*	0.27*	0.52*	0.64*	0.76*	0.89*	1.14*	1.26*	1.52*	2.32*	3.21*
	10	0.15*	0.29*	0.55*	0.69*	0.82*	0.96*	1.23*	1.37*	1.65*	2.57*	3.62*
	14	0.16*	0.32*	0.62*	0.77*	0.93*	1.08*	1.40*	1.57*	1.91*	3.06*	4.50*
400	8	0.15*	0.28*	0.54*	0.67*	0.80*	0.93*	1.19*	1.32*	1.59*	2.44*	3.37*
	10	0.16*	0.30*	0.58*	0.72*	0.86*	1.00*	1.29*	1.44*	1.74*	2.70*	3.81*
	14	0.17*	0.33*	0.65*	0.81*	0.97*	1.14*	1.47*	1.65*	2.01*	3.22*	4.73*
450	8	0.15*	0.29*	0.56*	0.69*	0.83*	0.96*	1.23*	1.37*	1.65*	2.54*	3.52*
	10	0.16*	0.31*	0.60*	0.74*	0.89*	1.04*	1.34*	1.50*	1.81*	2.82*	3.98*
	14	0.18*	0.34*	0.67*	0.84*	1.01*	1.19*	1.54*	1.73*	2.11*	3.37*	4.95*
500	8	0.16*	0.30*	0.58*	0.71*	0.85*	1.00*	1.28*	1.42*	1.72*	2.64*	3.67*
	10	0.16*	0.32*	0.62*	0.77*	0.93*	1.08*	1.40*	1.56*	1.88*	2.94*	4.15*
	14	0.18*	0.35*	0.70*	0.87*	1.05*	1.23*	1.61*	1.80*	2.20*	3.52*	5.16*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 m (RADIUS = 0.0 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	0.16*	0.31*	0.59*	0.74*	0.88*	1.03*	1.32*	1.47*	1.78*	2.74*	3.81*
	10	0.17*	0.33*	0.64*	0.80*	0.96*	1.12*	1.45*	1.61*	1.95*	3.05*	4.31*
	14	0.19*	0.36*	0.72*	0.91*	1.09*	1.28*	1.67*	1.87*	2.28*	3.66*	5.37*
600	8	0.16*	0.31*	0.61*	0.76*	0.91*	1.06*	1.37*	1.52*	1.84*	2.84*	3.94*
	10	0.17*	0.34*	0.66*	0.82*	0.99*	1.15*	1.49*	1.67*	2.02*	3.16*	4.47*
	14	0.19*	0.38*	0.75*	0.94*	1.13*	1.33*	1.73*	1.94*	2.37*	3.80*	5.56*
650	8	0.17*	0.32*	0.63*	0.78*	0.93*	1.09*	1.41*	1.57*	1.89*	2.93*	4.07*
	10	0.18*	0.34*	0.68*	0.85*	1.02*	1.19*	1.54*	1.72*	2.09*	3.27*	4.61*
	14	0.20*	0.39*	0.77*	0.97*	1.17*	1.37*	1.79*	2.00*	2.45*	3.93*	5.75*
700	8	0.17*	0.33*	0.64*	0.80*	0.96*	1.12*	1.45*	1.61*	1.95*	3.01*	4.19*
	10	0.18*	0.35*	0.70*	0.87*	1.05*	1.22*	1.59*	1.77*	2.15*	3.37*	4.76*
	14	0.20*	0.40*	0.79*	1.00*	1.20*	1.41*	1.84*	2.07*	2.53*	4.06*	5.93*
750	8	0.17*	0.34*	0.66*	0.82*	0.98*	1.15*	1.48*	1.65*	2.00*	3.10*	4.31*
	10	0.19*	0.36*	0.71*	0.89*	1.07*	1.26*	1.63*	1.82*	2.21*	3.47*	4.90*
	14	0.21*	0.41*	0.81*	1.02*	1.24*	1.45*	1.90*	2.13*	2.60*	4.18*	6.11*
800	8	0.18*	0.34*	0.67*	0.84*	1.01*	1.18*	1.52*	1.70*	2.05*	3.18*	4.43*
	10	0.19*	0.37*	0.73*	0.92*	1.10*	1.29*	1.67*	1.87*	2.27*	3.56*	5.04*
	14	0.21*	0.42*	0.84*	1.05*	1.27*	1.49*	1.95*	2.19*	2.68*	4.30*	6.28*
850	8	0.18*	0.35*	0.69*	0.86*	1.03*	1.20*	1.56*	1.74*	2.10*	3.26*	4.54*
	10	0.19*	0.38*	0.75*	0.94*	1.13*	1.32*	1.71*	1.92*	2.33*	3.66*	5.17*
	14	0.22*	0.43*	0.86*	1.08*	1.30*	1.53*	2.00*	2.25*	2.75*	4.42*	6.45*
900	8	0.18*	0.36*	0.70*	0.88*	1.05*	1.23*	1.59*	1.78*	2.15*	3.34*	4.66*
	10	0.20*	0.38*	0.76*	0.96*	1.15*	1.35*	1.76*	1.96*	2.39*	3.75*	5.30*
	14	0.22*	0.44*	0.88*	1.10*	1.33*	1.57*	2.05*	2.30*	2.82*	4.53*	6.61*
950	8	0.19*	0.36*	0.72*	0.90*	1.08*	1.26*	1.63*	1.82*	2.20*	3.42*	4.76*
	10	0.20*	0.39*	0.78*	0.98*	1.18*	1.38*	1.80*	2.01*	2.44*	3.84*	5.42*
	14	0.22*	0.44*	0.90*	1.13*	1.36*	1.61*	2.10*	2.36*	2.89*	4.65*	6.77*
1000	8	0.19*	0.37*	0.73*	0.91*	1.10*	1.28*	1.66*	1.86*	2.25*	3.50*	4.87*
	10	0.20*	0.40*	0.80*	1.00*	1.20*	1.41*	1.83*	2.05*	2.50*	3.93*	5.55*
	14	0.23*	0.45*	0.92*	1.15*	1.40*	1.64*	2.15*	2.41*	2.95*	4.76*	6.93*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 m (RADIUS = 0.0 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s)

RESPONSE
TIME INDEX

RATE
OF RISE

CEILING HEIGHT, m

(m*s)^{1/2}

°C/min

1

2

4

5

6

7

9

10

12

18

24

50

8

10

14

0.15*

0.16*

0.17*

0.28*

0.29*

0.31*

0.52*

0.54*

0.59*

0.64*

0.67*

0.73*

0.87*

100

8

10

14

0.17*

0.18*

0.19*

0.32*

0.33*

0.36*

0.60*

0.63*

0.70*

0.74*

0.79*

0.87*

0.88*

150

8

10

14

0.18*

0.19*

0.21*

0.34*

0.36*

0.40*

0.66*

0.71*

0.79*

0.82*

0.88*

0.99*

0.98*

200

8

10

14

0.19*

0.21*

0.22*

0.37*

0.39*

0.44*

0.72*

0.77*

0.87*

0.89*

0.96*

1.09*

1.07*

250

8

10

14

0.21*

0.22*

0.24*

0.39*

0.42*

0.47*

0.77*

0.83*

0.94*

0.96*

1.04*

1.18*

1.15*

300

8

10

14

0.22*

0.23*

0.25*

0.41*

0.44*

0.50*

0.81*

0.88*

1.00*

1.02*

1.11*

1.27*

1.22*

350

8

10

14

0.22*

0.24*

0.27*

0.43*

0.47*

0.53*

0.86*

0.93*

1.07*

1.07*

1.17*

1.35*

1.29*

400

8

10

14

0.23*

0.25*

0.28*

0.45*

0.49*

0.55*

0.90*

0.98*

1.12*

1.12*

1.23*

1.42*

1.35*

450

8

10

14

0.24*

0.26*

0.29*

0.47*

0.51*

0.58*

0.94*

1.02*

1.18*

1.17*

1.29*

1.49*

1.42*

500

8

10

14

0.25*

0.27*

0.30*

0.49*

0.53*

0.60*

0.97*

1.06*

1.23*

1.22*

1.34*

1.56*

1.47*

5.03*

8.37*

20.31*

5.24*

8.37*

20.31*

5.62*

8.42*

20.31*

6.02*

8.58*

20.31*

6.41*

8.82*

20.31*

6.78*

9.12*

20.31*

7.13*

9.43*

20.31*

7.46*

9.75*

20.32*

7.78*

10.07*

20.34*

5.19*

6.09*

8.30*

3.14*

3.54*

4.35*

2.55*

2.85*

3.44*

2.27*

3.03*

2.53*

2.26*

1.92*

1.63*

1.90*

1.73*

1.92*

2.27*

2.53*

3.03*

2.27*

2.27*

2.53*

2.26*

1.92*

1.63*

1.90*

1.73*

1.92*

2.27*

2.53*

3.03*

2.27*

2.27*

2.53*

2.26*

1.92*

1.63*

1.90*

1.73*

1.92*

2.27*

2.53*

3.03*

2.27*

2.27*

2.53*

2.26*

1.92*

1.63*

1.90*

1.73*

1.92*

2.27*

2.53*

3.03*

2.27*

2.27*

2.53*

2.26*

1.92*

1.63*

1.90*

1.73*

1.92*

2.27*

2.53*

3.03*

2.27*

2.27*

2.53*

2.26*

1.92*

1.63*

1.90*

1.73*

1.92*

2.27*

2.53*

3.03*

2.27*

2.27*

2.53*

2.26*

1.92*

1.63*

1.90*

1.73*

1.92*

2.27*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 m (RADIUS = 0.0 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m									
		1 2 4 5 6 7 9 10 12 18 24									
		(m*s) ^{1/2}									
550	8	0.26*	0.50*	1.01*	1.27*	1.53*	1.80*	2.36*	2.65*	3.26*	5.40*
	10	0.28*	0.55*	1.11*	1.39*	1.69*	2.00*	2.64*	2.97*	3.69*	6.33*
	14	0.31*	0.63*	1.28*	1.63*	1.98*	2.36*	3.16*	3.59*	4.54*	8.60*
600	8	0.26*	0.52*	1.04*	1.31*	1.59*	1.87*	2.45*	2.75*	3.39*	5.60*
	10	0.29*	0.57*	1.14*	1.44*	1.75*	2.07*	2.74*	3.09*	3.83*	6.57*
	14	0.32*	0.65*	1.33*	1.69*	2.06*	2.45*	3.28*	3.73*	4.72*	8.88*
650	8	0.27*	0.54*	1.08*	1.35*	1.64*	1.93*	2.53*	2.85*	3.50*	5.79*
	10	0.29*	0.58*	1.18*	1.49*	1.81*	2.14*	2.83*	3.20*	3.97*	6.79*
	14	0.33*	0.67*	1.38*	1.75*	2.14*	2.54*	3.40*	3.87*	4.89*	9.16*
700	8	0.28*	0.55*	1.11*	1.40*	1.69*	1.99*	2.61*	2.94*	3.62*	5.98*
	10	0.30*	0.60*	1.22*	1.54*	1.87*	2.21*	2.93*	3.30*	4.10*	7.01*
	14	0.34*	0.69*	1.42*	1.81*	2.21*	2.63*	3.52*	4.00*	5.05*	9.43*
750	8	0.29*	0.56*	1.14*	1.44*	1.74*	2.05*	2.69*	3.03*	3.73*	6.16*
	10	0.31*	0.62*	1.26*	1.59*	1.93*	2.28*	3.02*	3.40*	4.23*	7.22*
	14	0.35*	0.71*	1.47*	1.86*	2.28*	2.71*	3.63*	4.13*	5.22*	9.69*
800	8	0.29*	0.58*	1.17*	1.47*	1.79*	2.10*	2.77*	3.11*	3.83*	6.34*
	10	0.32*	0.63*	1.29*	1.63*	1.98*	2.35*	3.10*	3.50*	4.35*	7.43*
	14	0.36*	0.73*	1.51*	1.92*	2.35*	2.79*	3.74*	4.26*	5.37*	9.95*
850	8	0.30*	0.59*	1.20*	1.51*	1.83*	2.16*	2.84*	3.20*	3.94*	6.51*
	10	0.32*	0.65*	1.32*	1.68*	2.04*	2.41*	3.19*	3.60*	4.47*	7.63*
	14	0.37*	0.75*	1.55*	1.97*	2.41*	2.87*	3.85*	4.38*	5.52*	10.20*
900	8	0.30*	0.61*	1.23*	1.55*	1.88*	2.22*	2.92*	3.28*	4.04*	6.68*
	10	0.33*	0.66*	1.36*	1.72*	2.09*	2.47*	3.28*	3.70*	4.59*	7.83*
	14	0.38*	0.77*	1.59*	2.03*	2.48*	2.95*	3.96*	4.50*	5.67*	10.44*
950	8	0.31*	0.62*	1.26*	1.59*	1.92*	2.27*	2.99*	3.36*	4.14*	6.84*
	10	0.34*	0.68*	1.39*	1.76*	2.14*	2.53*	3.36*	3.79*	4.71*	8.02*
	14	0.39*	0.79*	1.63*	2.08*	2.54*	3.03*	4.06*	4.61*	5.82*	10.68*
1000	8	0.32*	0.63*	1.28*	1.62*	1.97*	2.32*	3.06*	3.44*	4.24*	7.00*
	10	0.34*	0.69*	1.42*	1.80*	2.19*	2.59*	3.44*	3.88*	4.82*	8.20*
	14	0.40*	0.80*	1.67*	2.13*	2.60*	3.10*	4.16*	4.73*	5.96*	10.92*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 m (RADIUS = 0.0 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}	°C/min											
50	8	0.22*	0.42*	0.81*	1.01*	1.22*	1.44*	1.95*	2.27*	3.17*	14.90*	58.09*
	10	0.23*	0.44*	0.86*	1.09*	1.33*	1.59*	2.26*	2.73*	4.60*	27.59*	111.54*
	14	0.25*	0.48*	0.97*	1.24*	1.56*	1.94*	3.27*	4.78*	10.55*	72.92*	302.58*
100	8	0.26*	0.49*	0.97*	1.22*	1.48*	1.76*	2.39*	2.76*	3.72*	14.90*	58.09*
	10	0.27*	0.53*	1.05*	1.33*	1.63*	1.96*	2.76*	3.27*	4.90*	27.59*	111.54*
	14	0.30*	0.59*	1.20*	1.55*	1.94*	2.40*	3.76*	5.00*	10.55*	72.92*	302.58*
150	8	0.28*	0.55*	1.10*	1.39*	1.69*	2.02*	2.74*	3.16*	4.20*	14.90*	58.09*
	10	0.30*	0.59*	1.20*	1.53*	1.88*	2.26*	3.16*	3.73*	5.35*	27.59*	111.54*
	14	0.34*	0.67*	1.39*	1.80*	2.25*	2.78*	4.23*	5.40*	10.56*	72.92*	302.58*
200	8	0.31*	0.60*	1.21*	1.54*	1.88*	2.24*	3.04*	3.51*	4.62*	14.91*	58.09*
	10	0.33*	0.65*	1.33*	1.70*	2.09*	2.52*	3.52*	4.13*	5.79*	27.59*	111.54*
	14	0.37*	0.74*	1.55*	2.01*	2.52*	3.11*	4.66*	5.82*	10.61*	72.92*	302.58*
250	8	0.33*	0.65*	1.32*	1.67*	2.04*	2.44*	3.31*	3.82*	5.01*	14.93*	58.09*
	10	0.36*	0.71*	1.45*	1.85*	2.28*	2.75*	3.83*	4.49*	6.21*	27.59*	111.54*
	14	0.40*	0.81*	1.70*	2.21*	2.76*	3.40*	5.05*	6.23*	10.75*	72.92*	302.58*
300	8	0.35*	0.69*	1.41*	1.79*	2.19*	2.62*	3.56*	4.10*	5.37*	15.00*	58.09*
	10	0.38*	0.76*	1.56*	1.99*	2.46*	2.96*	4.12*	4.82*	6.61*	27.59*	111.54*
	14	0.43*	0.87*	1.84*	2.38*	2.99*	3.67*	5.41*	6.63*	10.97*	72.92*	302.58*
350	8	0.37*	0.73*	1.50*	1.91*	2.34*	2.79*	3.80*	4.37*	5.70*	15.12*	58.09*
	10	0.40*	0.80*	1.66*	2.13*	2.62*	3.16*	4.40*	5.13*	6.99*	27.59*	111.54*
	14	0.45*	0.92*	1.96*	2.55*	3.19*	3.92*	5.75*	7.00*	11.23*	72.92*	302.58*
400	8	0.39*	0.77*	1.58*	2.01*	2.47*	2.95*	4.02*	4.62*	6.01*	15.30*	58.09*
	10	0.42*	0.84*	1.76*	2.25*	2.78*	3.35*	4.65*	5.42*	7.34*	27.59*	111.54*
	14	0.48*	0.98*	2.08*	2.70*	3.39*	4.15*	6.07*	7.35*	11.53*	72.92*	302.58*
450	8	0.40*	0.81*	1.66*	2.12*	2.60*	3.10*	4.22*	4.85*	6.31*	15.52*	58.09*
	10	0.44*	0.89*	1.85*	2.37*	2.93*	3.53*	4.89*	5.69*	7.68*	27.59*	111.54*
	14	0.50*	1.03*	2.19*	2.85*	3.57*	4.37*	6.37*	7.69*	11.84*	72.92*	302.58*
500	8	0.42*	0.84*	1.74*	2.21*	2.72*	3.25*	4.42*	5.08*	6.59*	15.76*	58.09*
	10	0.46*	0.93*	1.93*	2.48*	3.07*	3.69*	5.12*	5.96*	8.01*	27.60*	111.54*
	14	0.52*	1.08*	2.30*	2.99*	3.75*	4.59*	6.66*	8.02*	12.16*	72.92*	302.58*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 m (RADIUS = 0.0 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	0.43*	0.87*	1.81*	2.31*	2.83*	3.39*	4.61*	5.29*	6.86*	16.04*	58.09*
	10	0.47*	0.96*	2.02*	2.59*	3.20*	3.86*	5.35*	6.21*	8.32*	27.62*	111.54*
	14	0.55*	1.12*	2.41*	3.13*	3.91*	4.79*	6.94*	8.33*	12.49*	72.92*	302.58*
600	8	0.45*	0.91*	1.88*	2.40*	2.94*	3.52*	4.79*	5.50*	7.12*	16.32*	58.09*
	10	0.49*	1.00*	2.10*	2.69*	3.33*	4.01*	5.56*	6.45*	8.63*	27.64*	111.54*
	14	0.57*	1.17*	2.51*	3.26*	4.08*	4.99*	7.21*	8.63*	12.81*	72.92*	302.58*
650	8	0.46*	0.94*	1.95*	2.49*	3.05*	3.65*	4.97*	5.70*	7.38*	16.62*	58.09*
	10	0.51*	1.03*	2.18*	2.80*	3.46*	4.16*	5.76*	6.69*	8.92*	27.68*	111.54*
	14	0.59*	1.21*	2.60*	3.38*	4.23*	5.18*	7.47*	8.93*	13.13*	72.92*	302.58*
700	8	0.48*	0.97*	2.01*	2.57*	3.16*	3.78*	5.14*	5.90*	7.62*	16.93*	58.09*
	10	0.52*	1.07*	2.25*	2.89*	3.58*	4.31*	5.96*	6.92*	9.20*	27.74*	111.54*
	14	0.61*	1.25*	2.70*	3.50*	4.39*	5.36*	7.72*	9.21*	13.45*	72.92*	302.58*
750	8	0.49*	1.00*	2.07*	2.65*	3.26*	3.90*	5.31*	6.09*	7.86*	17.23*	58.09*
	10	0.54*	1.10*	2.32*	2.99*	3.69*	4.45*	6.16*	7.14*	9.48*	27.81*	111.54*
	14	0.62*	1.30*	2.79*	3.62*	4.53*	5.54*	7.96*	9.49*	13.77*	72.92*	302.58*
800	8	0.50*	1.02*	2.14*	2.73*	3.36*	4.02*	5.47*	6.27*	8.09*	17.54*	58.09*
	10	0.55*	1.13*	2.39*	3.08*	3.81*	4.59*	6.34*	7.35*	9.74*	27.90*	111.54*
	14	0.64*	1.34*	2.87*	3.74*	4.68*	5.71*	8.20*	9.76*	14.08*	72.92*	302.58*
850	8	0.52*	1.05*	2.20*	2.81*	3.45*	4.13*	5.62*	6.45*	8.31*	17.85*	58.09*
	10	0.57*	1.17*	2.46*	3.17*	3.92*	4.72*	6.53*	7.56*	10.01*	28.01*	111.54*
	14	0.66*	1.37*	2.96*	3.85*	4.82*	5.88*	8.43*	10.02*	14.38*	72.92*	302.58*
900	8	0.53*	1.08*	2.26*	2.89*	3.55*	4.25*	5.78*	6.62*	8.53*	18.16*	58.09*
	10	0.58*	1.20*	2.53*	3.26*	4.03*	4.85*	6.70*	7.76*	10.26*	28.13*	111.54*
	14	0.68*	1.41*	3.04*	3.96*	4.95*	6.05*	8.66*	10.27*	14.68*	72.92*	302.58*
950	8	0.54*	1.10*	2.31*	2.96*	3.64*	4.36*	5.93*	6.79*	8.74*	18.47*	58.09*
	10	0.60*	1.23*	2.60*	3.34*	4.14*	4.98*	6.88*	7.96*	10.51*	28.28*	111.54*
	14	0.70*	1.45*	3.13*	4.06*	5.08*	6.21*	8.88*	10.52*	14.98*	72.92*	302.58*
1000	8	0.55*	1.13*	2.37*	3.03*	3.73*	4.47*	6.07*	6.96*	8.95*	18.77*	58.09*
	10	0.61*	1.26*	2.66*	3.43*	4.24*	5.11*	7.05*	8.15*	10.75*	28.43*	111.54*
	14	0.71*	1.49*	3.21*	4.17*	5.21*	6.36*	9.09*	10.77*	15.27*	72.92*	302.58*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 m (RADIUS = 0.0 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
		(m*s) ^{1/2}										
50	8	0.34*	0.66*	1.37*	1.81*	2.36*	3.19*	7.86*	12.58*	29.56*	215.05*	899.99*
	10	0.36*	0.71*	1.53*	2.08*	2.93*	4.71*	14.21*	23.33*	56.29*	418.01*	1755.3*
	14	0.40*	0.80*	1.89*	2.92*	5.57*	11.14*	36.87*	61.71*	151.81*	1143.3*	4811.8*
100	8	0.41*	0.81*	1.72*	2.26*	2.92*	3.80*	7.90*	12.58*	29.56*	215.05*	899.99*
	10	0.44*	0.88*	1.93*	2.61*	3.54*	5.07*	14.21*	23.33*	56.29*	418.01*	1755.3*
	14	0.49*	1.02*	2.39*	3.50*	5.74*	11.14*	36.87*	61.71*	151.81*	1143.3*	4811.8*
150	8	0.47*	0.93*	1.99*	2.62*	3.38*	4.34*	8.11*	12.59*	29.56*	215.05*	899.99*
	10	0.50*	1.02*	2.25*	3.03*	4.05*	5.58*	14.21*	23.33*	56.29*	418.01*	1755.3*
	14	0.57*	1.19*	2.79*	4.02*	6.14*	11.15*	36.87*	61.71*	151.81*	1143.3*	4811.8*
200	8	0.51*	1.04*	2.23*	2.94*	3.77*	4.81*	8.47*	12.65*	29.56*	215.05*	899.99*
	10	0.56*	1.14*	2.53*	3.40*	4.51*	6.07*	14.22*	23.33*	56.29*	418.01*	1755.3*
	14	0.64*	1.34*	3.14*	4.47*	6.59*	11.23*	36.87*	61.71*	151.81*	1143.3*	4811.8*
250	8	0.56*	1.13*	2.44*	3.22*	4.12*	5.23*	8.90*	12.79*	29.56*	215.05*	899.99*
	10	0.61*	1.25*	2.78*	3.73*	4.92*	6.54*	14.28*	23.33*	56.29*	418.01*	1755.3*
	14	0.70*	1.48*	3.46*	4.88*	7.05*	11.40*	36.87*	61.71*	151.81*	1143.3*	4811.8*
300	8	0.60*	1.22*	2.64*	3.48*	4.45*	5.63*	9.33*	13.02*	29.56*	215.05*	899.99*
	10	0.65*	1.35*	3.01*	4.03*	5.30*	6.98*	14.41*	23.33*	56.29*	418.01*	1755.3*
	14	0.76*	1.60*	3.75*	5.26*	7.48*	11.65*	36.87*	61.71*	151.81*	1143.3*	4811.8*
350	8	0.63*	1.30*	2.82*	3.72*	4.75*	5.99*	9.77*	13.31*	29.56*	215.05*	899.99*
	10	0.70*	1.45*	3.22*	4.31*	5.65*	7.40*	14.61*	23.34*	56.29*	418.01*	1755.3*
	14	0.81*	1.72*	4.02*	5.62*	7.90*	11.96*	36.87*	61.71*	151.81*	1143.3*	4811.8*
400	8	0.67*	1.38*	3.00*	3.95*	5.04*	6.34*	10.19*	13.64*	29.57*	215.05*	899.99*
	10	0.74*	1.54*	3.42*	4.58*	5.98*	7.79*	14.87*	23.36*	56.29*	418.01*	1755.3*
	14	0.86*	1.83*	4.27*	5.95*	8.30*	12.30*	36.87*	61.71*	151.81*	1143.3*	4811.8*
450	8	0.70*	1.45*	3.16*	4.16*	5.31*	6.67*	10.60*	14.00*	29.57*	215.05*	899.99*
	10	0.78*	1.62*	3.61*	4.83*	6.30*	8.17*	15.16*	23.40*	56.29*	418.01*	1755.3*
	14	0.91*	1.93*	4.51*	6.27*	8.69*	12.66*	36.87*	61.71*	151.81*	1143.3*	4811.8*
500	8	0.73*	1.52*	3.32*	4.37*	5.57*	6.98*	11.00*	14.36*	29.59*	215.05*	899.99*
	10	0.81*	1.70*	3.79*	5.07*	6.60*	8.53*	15.48*	23.47*	56.29*	418.01*	1755.3*
	14	0.95*	2.03*	4.74*	6.57*	9.06*	13.02*	36.87*	61.71*	151.81*	1143.3*	4811.8*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 m (RADIUS = 0.0 m)
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE
 TIME INDEX

RATE
 OF RISE

(m*s)^{1/2}

°C/min

CEILING HEIGHT, m

24

18

12

10

9

7

6

5

4

2

1

550	8	0.77*	1.59*	3.47*	4.57*	5.82*	7.28*	11.39*	14.74*	29.61*	215.05*	899.99*
	10	0.85*	1.78*	3.97*	5.30*	6.89*	8.88*	15.81*	23.56*	56.29*	418.01*	1755.3*
	14	1.00*	2.13*	4.96*	6.86*	9.41*	13.39*	36.87*	61.71*	151.81*	1143.3*	4811.8*
600	8	0.79*	1.65*	3.61*	4.76*	6.05*	7.57*	11.77*	15.11*	29.65*	215.05*	899.99*
	10	0.88*	1.85*	4.14*	5.52*	7.17*	9.21*	16.15*	23.69*	56.29*	418.01*	1755.3*
	14	1.04*	2.22*	5.17*	7.14*	9.76*	13.75*	36.88*	61.71*	151.81*	1143.3*	4811.8*
650	8	0.82*	1.72*	3.75*	4.94*	6.28*	7.85*	12.14*	15.48*	29.71*	215.05*	899.99*
	10	0.91*	1.93*	4.30*	5.74*	7.43*	9.53*	16.50*	23.85*	56.29*	418.01*	1755.3*
	14	1.08*	2.31*	5.38*	7.41*	10.09*	14.11*	36.88*	61.71*	151.81*	1143.3*	4811.8*
700	8	0.85*	1.78*	3.89*	5.12*	6.51*	8.12*	12.50*	15.85*	29.79*	215.05*	899.99*
	10	0.95*	1.99*	4.46*	5.94*	7.69*	9.85*	16.85*	24.04*	56.29*	418.01*	1755.3*
	14	1.12*	2.40*	5.57*	7.67*	10.41*	14.46*	36.89*	61.71*	151.81*	1143.3*	4811.8*
750	8	0.88*	1.84*	4.02*	5.29*	6.72*	8.38*	12.85*	16.21*	29.90*	215.05*	899.99*
	10	0.98*	2.06*	4.61*	6.14*	7.95*	10.15*	17.20*	24.25*	56.29*	418.01*	1755.3*
	14	1.15*	2.48*	5.76*	7.92*	10.73*	14.81*	36.91*	61.71*	151.81*	1143.3*	4811.8*
800	8	0.90*	1.89*	4.15*	5.46*	6.93*	8.63*	13.19*	16.57*	30.02*	215.05*	899.99*
	10	1.01*	2.13*	4.76*	6.34*	8.19*	10.45*	17.55*	24.47*	56.29*	418.01*	1755.3*
	14	1.19*	2.56*	5.95*	8.17*	11.04*	15.16*	36.94*	61.71*	151.81*	1143.3*	4811.8*
850	8	0.93*	1.95*	4.27*	5.62*	7.14*	8.88*	13.52*	16.93*	30.17*	215.05*	899.99*
	10	1.04*	2.19*	4.90*	6.53*	8.43*	10.74*	17.89*	24.72*	56.29*	418.01*	1755.3*
	14	1.23*	2.64*	6.13*	8.41*	11.33*	15.50*	36.97*	61.71*	151.81*	1143.3*	4811.8*
900	8	0.96*	2.00*	4.40*	5.78*	7.34*	9.12*	13.84*	17.28*	30.33*	215.05*	899.99*
	10	1.06*	2.26*	5.04*	6.71*	8.66*	11.02*	18.23*	24.98*	56.29*	418.01*	1755.3*
	14	1.26*	2.72*	6.31*	8.64*	11.63*	15.83*	37.02*	61.71*	151.81*	1143.3*	4811.8*
950	8	0.98*	2.06*	4.52*	5.94*	7.53*	9.36*	14.16*	17.62*	30.52*	215.05*	899.99*
	10	1.09*	2.32*	5.18*	6.90*	8.89*	11.29*	18.57*	25.24*	56.29*	418.01*	1755.3*
	14	1.30*	2.79*	6.48*	8.87*	11.91*	16.16*	37.07*	61.71*	151.81*	1143.3*	4811.8*
1000	8	1.00*	2.11*	4.63*	6.09*	7.72*	9.59*	14.47*	17.96*	30.72*	215.05*	899.99*
	10	1.12*	2.38*	5.32*	7.07*	9.11*	11.56*	18.91*	25.52*	56.30*	418.01*	1755.3*
	14	1.33*	2.87*	6.65*	9.10*	12.19*	16.48*	37.15*	61.71*	151.81*	1143.3*	4811.8*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.5 m (RADIUS = 0.4 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	0.15	0.23*	0.39*	0.46*	0.54*	0.61*	0.75*	0.83*	0.97*	1.42*	1.92*
	10	0.15	0.24*	0.40*	0.48*	0.56*	0.63*	0.79*	0.87*	1.02*	1.52*	2.12*
	14	0.16	0.25*	0.42*	0.51*	0.59*	0.68*	0.85*	0.94*	1.12*	1.74*	2.69*
100	8	0.16	0.25*	0.43*	0.52*	0.60*	0.69*	0.86*	0.94*	1.12*	1.65*	2.25*
	10	0.17	0.26*	0.45*	0.54*	0.63*	0.73*	0.91*	1.00*	1.19*	1.79*	2.49*
	14	0.18	0.28*	0.49*	0.59*	0.69*	0.79*	1.00*	1.11*	1.33*	2.07*	3.12*
150	8	0.17	0.27*	0.47*	0.56*	0.66*	0.75*	0.94*	1.04*	1.23*	1.84*	2.51*
	10	0.18	0.29*	0.49*	0.59*	0.70*	0.80*	1.01*	1.11*	1.32*	2.00*	2.80*
	14	0.20	0.31*	0.54*	0.65*	0.77*	0.88*	1.12*	1.24*	1.49*	2.34*	3.49*
200	8	0.18	0.29*	0.50*	0.60*	0.71*	0.81*	1.02*	1.12*	1.33*	2.00*	2.73*
	10	0.19	0.31*	0.53*	0.64*	0.75*	0.86*	1.09*	1.20*	1.44*	2.19*	3.06*
	14	0.21	0.33*	0.58*	0.71*	0.83*	0.96*	1.23*	1.36*	1.64*	2.58*	3.81*
250	8	0.19	0.30*	0.53*	0.64*	0.75*	0.86*	1.08*	1.19*	1.42*	2.14*	2.93*
	10	0.20	0.32*	0.56*	0.68*	0.80*	0.92*	1.17*	1.29*	1.54*	2.36*	3.30*
	14	0.22	0.35*	0.62*	0.76*	0.90*	1.03*	1.32*	1.47*	1.77*	2.79*	4.11*
300	8	0.20	0.32*	0.55*	0.67*	0.79*	0.91*	1.14*	1.26*	1.51*	2.27*	3.12*
	10	0.21	0.34*	0.59*	0.72*	0.85*	0.97*	1.23*	1.37*	1.64*	2.51*	3.51*
	14	0.23	0.37*	0.66*	0.80*	0.95*	1.10*	1.41*	1.56*	1.89*	2.98*	4.38*
350	8	0.21	0.33*	0.58*	0.70*	0.83*	0.95*	1.20*	1.33*	1.58*	2.39*	3.29*
	10	0.22	0.35*	0.62*	0.75*	0.89*	1.02*	1.30*	1.44*	1.73*	2.65*	3.72*
	14	0.24	0.39*	0.69*	0.85*	1.00*	1.16*	1.49*	1.65*	2.00*	3.16*	4.64*
400	8	0.22	0.34*	0.60*	0.73*	0.86*	0.99*	1.25*	1.39*	1.66*	2.51*	3.46*
	10	0.23	0.37*	0.65*	0.79*	0.93*	1.07*	1.36*	1.51*	1.81*	2.79*	3.91*
	14	0.25	0.41*	0.73*	0.89*	1.05*	1.22*	1.56*	1.74*	2.10*	3.33*	4.88*
450	8	0.22	0.36*	0.62*	0.76*	0.89*	1.03*	1.30*	1.44*	1.73*	2.62*	3.61*
	10	0.24	0.38*	0.67*	0.82*	0.97*	1.12*	1.42*	1.58*	1.89*	2.91*	4.09*
	14	0.26	0.42*	0.76*	0.93*	1.10*	1.27*	1.63*	1.82*	2.20*	3.49*	5.10*
500	8	0.23	0.37*	0.64*	0.78*	0.92*	1.07*	1.35*	1.50*	1.79*	2.73*	3.76*
	10	0.24	0.39*	0.70*	0.85*	1.00*	1.16*	1.48*	1.64*	1.97*	3.04*	4.26*
	14	0.27	0.44*	0.79*	0.96*	1.14*	1.33*	1.70*	1.90*	2.30*	3.64*	5.32*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.5 m (RADIUS = 0.4 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	0.24	0.38*	0.67*	0.81*	0.96*	1.10*	1.40*	1.55*	1.86*	2.83*	3.90*
	10	0.25	0.40*	0.72*	0.88*	1.04*	1.20*	1.53*	1.70*	2.04*	3.15*	4.43*
	14	0.28	0.45*	0.82*	1.00*	1.19*	1.38*	1.77*	1.97*	2.39*	3.79*	5.53*
600	8	0.24	0.39*	0.68*	0.83*	0.98*	1.14*	1.44*	1.60*	1.92*	2.92*	4.04*
	10	0.26	0.42*	0.74*	0.91*	1.07*	1.24*	1.58*	1.76*	2.11*	3.27*	4.58*
	14	0.29	0.47*	0.84*	1.03*	1.23*	1.43*	1.83*	2.04*	2.48*	3.93*	5.73*
650	8	0.25	0.40*	0.70*	0.86*	1.01*	1.17*	1.49*	1.65*	1.98*	3.02*	4.17*
	10	0.27	0.43*	0.76*	0.93*	1.10*	1.28*	1.63*	1.81*	2.18*	3.37*	4.74*
	14	0.30	0.48*	0.87*	1.07*	1.27*	1.47*	1.90*	2.11*	2.56*	4.07*	5.92*
700	8	0.25	0.41*	0.72*	0.88*	1.04*	1.20*	1.53*	1.70*	2.03*	3.11*	4.30*
	10	0.27	0.44*	0.78*	0.96*	1.14*	1.31*	1.68*	1.87*	2.25*	3.48*	4.89*
	14	0.31	0.50*	0.90*	1.10*	1.31*	1.52*	1.96*	2.18*	2.65*	4.20*	6.11*
750	8	0.26	0.42*	0.74*	0.90*	1.07*	1.23*	1.57*	1.74*	2.09*	3.20*	4.42*
	10	0.28	0.45*	0.80*	0.98*	1.17*	1.35*	1.73*	1.92*	2.31*	3.58*	5.03*
	14	0.31	0.51*	0.92*	1.13*	1.35*	1.56*	2.01*	2.25*	2.73*	4.33*	6.29*
800	8	0.26	0.42*	0.76*	0.92*	1.09*	1.26*	1.61*	1.79*	2.15*	3.28*	4.54*
	10	0.28	0.46*	0.82*	1.01*	1.20*	1.39*	1.77*	1.97*	2.38*	3.68*	5.17*
	14	0.32	0.52*	0.94*	1.16*	1.38*	1.61*	2.07*	2.31*	2.80*	4.45*	6.47*
850	8	0.27	0.43*	0.77*	0.95*	1.12*	1.29*	1.65*	1.83*	2.20*	3.37*	4.66*
	10	0.29	0.47*	0.84*	1.03*	1.23*	1.42*	1.82*	2.02*	2.44*	3.78*	5.31*
	14	0.33	0.53*	0.97*	1.19*	1.42*	1.65*	2.13*	2.37*	2.88*	4.58*	6.64*
900	8	0.27	0.44*	0.79*	0.97*	1.14*	1.32*	1.69*	1.87*	2.25*	3.45*	4.77*
	10	0.30	0.48*	0.86*	1.06*	1.25*	1.45*	1.86*	2.07*	2.50*	3.87*	5.44*
	14	0.34	0.55*	0.99*	1.22*	1.45*	1.69*	2.18*	2.43*	2.95*	4.69*	6.81*
950	8	0.28	0.45*	0.81*	0.99*	1.17*	1.35*	1.72*	1.91*	2.30*	3.53*	4.89*
	10	0.30	0.49*	0.88*	1.08*	1.28*	1.49*	1.90*	2.12*	2.55*	3.97*	5.57*
	14	0.34	0.56*	1.01*	1.25*	1.49*	1.73*	2.23*	2.49*	3.03*	4.81*	6.97*
1000	8	0.28	0.46*	0.82*	1.01*	1.19*	1.38*	1.76*	1.95*	2.35*	3.61*	4.99*
	10	0.31	0.50*	0.90*	1.10*	1.31*	1.52*	1.95*	2.16*	2.61*	4.06*	5.70*
	14	0.35	0.57*	1.04*	1.28*	1.52*	1.77*	2.28*	2.55*	3.10*	4.92*	7.13*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.5 m (RADIUS = 0.4 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s²)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	0.22	0.34*	0.58*	0.69*	0.81*	0.93*	1.17*	1.30*	1.57*	2.60*	5.41*
	10	0.22	0.35*	0.60*	0.73*	0.86*	0.99*	1.26*	1.40*	1.72*	3.24*	9.09*
	14	0.24	0.38*	0.66*	0.80*	0.95*	1.10*	1.43*	1.62*	2.08*	6.30*	22.24*
100	8	0.24	0.38*	0.67*	0.81*	0.95*	1.09*	1.39*	1.55*	1.87*	3.09*	5.57*
	10	0.26	0.40*	0.71*	0.86*	1.02*	1.18*	1.51*	1.69*	2.07*	3.71*	9.09*
	14	0.28	0.44*	0.78*	0.96*	1.15*	1.34*	1.75*	1.98*	2.52*	6.33*	22.24*
150	8	0.27	0.42*	0.74*	0.90*	1.06*	1.23*	1.57*	1.74*	2.12*	3.48*	5.91*
	10	0.28	0.45*	0.79*	0.97*	1.15*	1.33*	1.71*	1.92*	2.36*	4.15*	9.12*
	14	0.31	0.50*	0.89*	1.09*	1.31*	1.53*	2.01*	2.27*	2.88*	6.51*	22.24*
200	8	0.29	0.46*	0.80*	0.98*	1.16*	1.34*	1.72*	1.91*	2.33*	3.82*	6.30*
	10	0.30	0.49*	0.87*	1.06*	1.26*	1.46*	1.89*	2.12*	2.60*	4.54*	9.23*
	14	0.34	0.54*	0.98*	1.21*	1.45*	1.69*	2.23*	2.52*	3.19*	6.80*	22.24*
250	8	0.30	0.49*	0.86*	1.05*	1.25*	1.44*	1.85*	2.07*	2.52*	4.13*	6.69*
	10	0.32	0.52*	0.93*	1.14*	1.36*	1.58*	2.05*	2.30*	2.82*	4.89*	9.43*
	14	0.36	0.58*	1.06*	1.31*	1.57*	1.84*	2.43*	2.75*	3.47*	7.13*	22.24*
300	8	0.32	0.51*	0.91*	1.12*	1.33*	1.54*	1.98*	2.21*	2.69*	4.42*	7.06*
	10	0.34	0.55*	0.99*	1.22*	1.45*	1.69*	2.19*	2.46*	3.03*	5.22*	9.69*
	14	0.38	0.62*	1.14*	1.41*	1.69*	1.98*	2.61*	2.95*	3.72*	7.48*	22.24*
350	8	0.34	0.54*	0.96*	1.18*	1.40*	1.63*	2.10*	2.34*	2.85*	4.68*	7.41*
	10	0.36	0.58*	1.05*	1.29*	1.54*	1.79*	2.33*	2.61*	3.22*	5.53*	9.98*
	14	0.41	0.66*	1.21*	1.50*	1.79*	2.11*	2.78*	3.15*	3.96*	7.81*	22.24*
400	8	0.35	0.56*	1.01*	1.24*	1.47*	1.71*	2.21*	2.47*	3.01*	4.93*	7.75*
	10	0.38	0.61*	1.10*	1.36*	1.62*	1.89*	2.46*	2.76*	3.39*	5.82*	10.29*
	14	0.43	0.69*	1.27*	1.58*	1.90*	2.23*	2.94*	3.33*	4.19*	8.15*	22.25*
450	8	0.36	0.59*	1.06*	1.30*	1.54*	1.79*	2.31*	2.58*	3.15*	5.17*	8.08*
	10	0.39	0.64*	1.15*	1.42*	1.70*	1.98*	2.58*	2.89*	3.56*	6.09*	10.60*
	14	0.44	0.73*	1.34*	1.66*	1.99*	2.34*	3.09*	3.50*	4.40*	8.47*	22.25*
500	8	0.38	0.61*	1.10*	1.35*	1.61*	1.87*	2.41*	2.70*	3.29*	5.39*	8.39*
	10	0.41	0.66*	1.20*	1.48*	1.77*	2.07*	2.69*	3.02*	3.73*	6.35*	10.91*
	14	0.46	0.76*	1.40*	1.73*	2.08*	2.45*	3.24*	3.66*	4.60*	8.78*	22.27*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.5 m (RADIUS = 0.4 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550 (m*s) ^{1/2}	8	0.39	0.63*	1.14*	1.40*	1.67*	1.94*	2.51*	2.80*	3.43*	5.61*	8.69*
	10	0.42	0.69*	1.25*	1.54*	1.84*	2.15*	2.81*	3.15*	3.88*	6.60*	11.23*
	14	0.48	0.79*	1.46*	1.81*	2.17*	2.55*	3.38*	3.82*	4.80*	9.08*	22.30*
600	8	0.40	0.65*	1.18*	1.45*	1.73*	2.01*	2.60*	2.91*	3.55*	5.81*	8.98*
	10	0.44	0.71*	1.30*	1.60*	1.91*	2.24*	2.91*	3.27*	4.03*	6.85*	11.53*
	14	0.50	0.82*	1.51*	1.88*	2.26*	2.66*	3.51*	3.97*	4.99*	9.37*	22.34*
650	8	0.41	0.67*	1.22*	1.50*	1.78*	2.08*	2.69*	3.01*	3.68*	6.01*	9.26*
	10	0.45	0.73*	1.34*	1.66*	1.98*	2.31*	3.02*	3.39*	4.17*	7.08*	11.83*
	14	0.51	0.84*	1.57*	1.95*	2.34*	2.75*	3.64*	4.12*	5.17*	9.66*	22.40*
700	8	0.42	0.69*	1.25*	1.54*	1.84*	2.14*	2.78*	3.11*	3.80*	6.21*	9.53*
	10	0.46	0.75*	1.38*	1.71*	2.04*	2.39*	3.12*	3.50*	4.31*	7.31*	12.13*
	14	0.53	0.87*	1.62*	2.01*	2.42*	2.85*	3.76*	4.26*	5.34*	9.94*	22.48*
750	8	0.44	0.71*	1.29*	1.59*	1.89*	2.21*	2.86*	3.20*	3.91*	6.40*	9.80*
	10	0.47	0.78*	1.42*	1.76*	2.11*	2.46*	3.21*	3.61*	4.45*	7.53*	12.42*
	14	0.55	0.90*	1.67*	2.07*	2.50*	2.94*	3.88*	4.40*	5.51*	10.21*	22.58*
800	8	0.45	0.73*	1.32*	1.63*	1.95*	2.27*	2.94*	3.29*	4.03*	6.58*	10.05*
	10	0.49	0.80*	1.46*	1.81*	2.17*	2.53*	3.31*	3.71*	4.58*	7.74*	12.70*
	14	0.56	0.92*	1.72*	2.14*	2.57*	3.03*	4.00*	4.53*	5.68*	10.47*	22.70*
850	8	0.46	0.74*	1.36*	1.67*	2.00*	2.33*	3.02*	3.38*	4.14*	6.76*	10.30*
	10	0.50	0.82*	1.50*	1.86*	2.23*	2.60*	3.40*	3.82*	4.71*	7.95*	12.98*
	14	0.58	0.95*	1.77*	2.20*	2.65*	3.11*	4.12*	4.66*	5.84*	10.73*	22.83*
900	8	0.47	0.76*	1.39*	1.72*	2.05*	2.39*	3.10*	3.47*	4.24*	6.93*	10.55*
	10	0.51	0.84*	1.54*	1.91*	2.28*	2.67*	3.49*	3.92*	4.83*	8.15*	13.26*
	14	0.59	0.97*	1.81*	2.26*	2.72*	3.20*	4.23*	4.79*	6.00*	10.98*	22.98*
950	8	0.48	0.78*	1.42*	1.76*	2.10*	2.45*	3.18*	3.56*	4.35*	7.10*	10.79*
	10	0.52	0.86*	1.58*	1.95*	2.34*	2.74*	3.58*	4.02*	4.95*	8.35*	13.53*
	14	0.60	1.00*	1.86*	2.31*	2.79*	3.28*	4.34*	4.91*	6.15*	11.23*	23.14*
1000	8	0.49	0.80*	1.46*	1.80*	2.15*	2.51*	3.25*	3.64*	4.45*	7.27*	11.02*
	10	0.53	0.88*	1.61*	2.00*	2.40*	2.81*	3.66*	4.12*	5.07*	8.54*	13.79*
	14	0.62	1.02*	1.90*	2.37*	2.86*	3.36*	4.45*	5.03*	6.30*	11.47*	23.31*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.5 m (RADIUS = 0.4 m)³
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}	°C/min											
50	8	0.32	0.51*	0.90*	1.11*	1.32*	1.56*	2.10*	2.44*	3.49*	16.76*	63.83*
	10	0.34	0.54*	0.97*	1.20*	1.45*	1.73*	2.46*	3.03*	5.34*	31.19*	122.72*
	14	0.37	0.60*	1.10*	1.39*	1.73*	2.16*	3.87*	5.78*	12.56*	82.75*	333.20*
100	8	0.38	0.61*	1.09*	1.35*	1.62*	1.91*	2.57*	2.96*	4.02*	16.76*	63.83*
	10	0.40	0.65*	1.19*	1.48*	1.79*	2.14*	2.99*	3.57*	5.52*	31.19*	122.72*
	14	0.45	0.73*	1.37*	1.74*	2.16*	2.67*	4.26*	5.87*	12.56*	82.75*	333.20*
150	8	0.42	0.68*	1.24*	1.54*	1.85*	2.18*	2.94*	3.39*	4.51*	16.76*	63.83*
	10	0.46	0.74*	1.36*	1.70*	2.06*	2.46*	3.43*	4.05*	5.91*	31.19*	122.72*
	14	0.51	0.84*	1.59*	2.02*	2.50*	3.08*	4.73*	6.18*	12.56*	82.75*	333.20*
200	8	0.46	0.75*	1.37*	1.70*	2.05*	2.43*	3.27*	3.75*	4.96*	16.76*	63.83*
	10	0.50	0.82*	1.51*	1.89*	2.30*	2.75*	3.81*	4.47*	6.35*	31.19*	122.72*
	14	0.57	0.94*	1.78*	2.26*	2.80*	3.43*	5.17*	6.57*	12.58*	82.75*	333.20*
250	8	0.50	0.81*	1.49*	1.85*	2.24*	2.64*	3.56*	4.08*	5.36*	16.77*	63.83*
	10	0.54	0.89*	1.65*	2.07*	2.51*	3.00*	4.15*	4.85*	6.77*	31.19*	122.72*
	14	0.62	1.02*	1.95*	2.48*	3.07*	3.75*	5.58*	6.97*	12.64*	82.75*	333.20*
300	8	0.53	0.87*	1.60*	1.99*	2.41*	2.84*	3.83*	4.39*	5.73*	16.80*	63.83*
	10	0.58	0.95*	1.78*	2.23*	2.71*	3.23*	4.46*	5.20*	7.18*	31.19*	122.72*
	14	0.66	1.10*	2.11*	2.68*	3.32*	4.04*	5.96*	7.36*	12.75*	82.75*	333.20*
350	8	0.56	0.92*	1.70*	2.12*	2.56*	3.03*	4.08*	4.67*	6.08*	16.87*	63.83*
	10	0.61	1.01*	1.89*	2.37*	2.89*	3.45*	4.75*	5.53*	7.56*	31.19*	122.72*
	14	0.71	1.17*	2.25*	2.87*	3.55*	4.32*	6.32*	7.74*	12.93*	82.75*	333.20*
400	8	0.59	0.97*	1.80*	2.24*	2.71*	3.21*	4.31*	4.94*	6.41*	16.98*	63.83*
	10	0.65	1.07*	2.00*	2.51*	3.06*	3.65*	5.02*	5.84*	7.93*	31.19*	122.72*
	14	0.75	1.24*	2.39*	3.04*	3.76*	4.58*	6.66*	8.11*	13.16*	82.75*	333.20*
450	8	0.62	1.02*	1.89*	2.36*	2.85*	3.37*	4.53*	5.19*	6.72*	17.14*	63.83*
	10	0.68	1.12*	2.11*	2.65*	3.22*	3.85*	5.28*	6.13*	8.29*	31.19*	122.72*
	14	0.79	1.31*	2.52*	3.21*	3.97*	4.82*	6.99*	8.47*	13.42*	82.75*	333.20*
500	8	0.65	1.06*	1.98*	2.47*	2.98*	3.53*	4.75*	5.43*	7.02*	17.33*	63.83*
	10	0.71	1.17*	2.21*	2.77*	3.38*	4.03*	5.53*	6.41*	8.63*	31.19*	122.72*
	14	0.82	1.37*	2.65*	3.37*	4.16*	5.05*	7.30*	8.81*	13.70*	82.75*	333.20*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.5 m (RADIUS = 0.4 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
		(m*s) ^{1/2}										
550	8	0.67	1.10*	2.06*	2.57*	3.11*	3.68*	4.95*	5.66*	7.31*	17.56*	63.83*
	10	0.74	1.22*	2.31*	2.90*	3.53*	4.21*	5.77*	6.68*	8.96*	31.20*	122.72*
	14	0.86	1.44*	2.77*	3.52*	4.35*	5.28*	7.59*	9.14*	14.00*	82.75*	333.20*
600	8	0.69	1.15*	2.14*	2.67*	3.24*	3.83*	5.15*	5.88*	7.58*	17.81*	63.83*
	10	0.77	1.27*	2.40*	3.01*	3.67*	4.38*	6.00*	6.94*	9.27*	31.21*	122.72*
	14	0.89	1.49*	2.88*	3.67*	4.53*	5.49*	7.88*	9.45*	14.30*	82.75*	333.20*
650	8	0.72	1.19*	2.22*	2.77*	3.35*	3.97*	5.33*	6.10*	7.85*	18.07*	63.83*
	10	0.79	1.32*	2.49*	3.13*	3.81*	4.54*	6.22*	7.19*	9.58*	31.22*	122.72*
	14	0.93	1.55*	2.99*	3.81*	4.70*	5.70*	8.16*	9.76*	14.61*	82.75*	333.20*
700	8	0.74	1.22*	2.29*	2.87*	3.47*	4.11*	5.52*	6.30*	8.11*	18.35*	63.83*
	10	0.82	1.36*	2.58*	3.24*	3.94*	4.70*	6.43*	7.43*	9.88*	31.25*	122.72*
	14	0.96	1.61*	3.10*	3.94*	4.87*	5.90*	8.43*	10.06*	14.92*	82.75*	333.20*
750	8	0.76	1.26*	2.37*	2.96*	3.58*	4.24*	5.70*	6.51*	8.36*	18.64*	63.83*
	10	0.84	1.40*	2.66*	3.34*	4.07*	4.86*	6.64*	7.67*	10.17*	31.28*	122.72*
	14	0.99	1.66*	3.21*	4.08*	5.03*	6.09*	8.69*	10.36*	15.23*	82.75*	333.20*
800	8	0.79	1.30*	2.44*	3.05*	3.69*	4.37*	5.87*	6.70*	8.60*	18.93*	63.83*
	10	0.87	1.45*	2.74*	3.45*	4.20*	5.01*	6.84*	7.90*	10.45*	31.33*	122.72*
	14	1.02	1.71*	3.31*	4.21*	5.19*	6.28*	8.94*	10.64*	15.54*	82.75*	333.20*
850	8	0.81	1.33*	2.51*	3.14*	3.80*	4.50*	6.04*	6.89*	8.84*	19.23*	63.83*
	10	0.89	1.49*	2.82*	3.55*	4.32*	5.16*	7.04*	8.12*	10.72*	31.40*	122.72*
	14	1.05	1.76*	3.41*	4.33*	5.35*	6.47*	9.19*	10.92*	15.84*	82.75*	333.20*
900	8	0.83	1.37*	2.58*	3.22*	3.90*	4.62*	6.20*	7.08*	9.07*	19.53*	63.83*
	10	0.92	1.53*	2.90*	3.65*	4.44*	5.30*	7.23*	8.34*	10.99*	31.47*	122.72*
	14	1.08	1.81*	3.50*	4.46*	5.50*	6.65*	9.43*	11.19*	16.15*	82.75*	333.20*
950	8	0.85	1.40*	2.64*	3.31*	4.00*	4.74*	6.36*	7.26*	9.29*	19.83*	63.83*
	10	0.94	1.57*	2.98*	3.74*	4.56*	5.44*	7.41*	8.55*	11.25*	31.57*	122.72*
	14	1.11	1.86*	3.60*	4.58*	5.64*	6.82*	9.67*	11.45*	16.45*	82.75*	333.20*
1000	8	0.87	1.44*	2.71*	3.39*	4.10*	4.86*	6.52*	7.44*	9.51*	20.13*	63.83*
	10	0.96	1.60*	3.05*	3.84*	4.68*	5.58*	7.60*	8.76*	11.51*	31.67*	122.72*
	14	1.13	1.91*	3.69*	4.69*	5.79*	7.00*	9.90*	11.71*	16.74*	82.75*	333.20*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.5 m (RADIUS = 0.4 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	0.51	0.83*	1.57*	2.05*	2.70*	3.81*	9.83*	15.53*	35.53*	244.34*	991.34*
	10	0.54	0.89*	1.78*	2.43*	3.58*	6.15*	18.00*	29.03*	67.90*	475.18*	1933.7*
	14	0.60	1.02*	2.29*	3.84*	7.75*	15.06*	47.21*	77.28*	183.58*	1300.1*	5301.3*
100	8	0.62	1.02*	1.97*	2.57*	3.31*	4.38*	9.83*	15.53*	35.53*	244.34*	991.34*
	10	0.67	1.12*	2.25*	3.02*	4.15*	6.29*	18.00*	29.03*	67.90*	475.18*	1933.7*
	14	0.77	1.31*	2.87*	4.32*	7.78*	15.06*	47.21*	77.28*	183.58*	1300.1*	5301.3*
150	8	0.71	1.18*	2.29*	2.98*	3.81*	4.93*	9.91*	15.53*	35.53*	244.34*	991.34*
	10	0.78	1.30*	2.62*	3.50*	4.70*	6.68*	18.00*	29.03*	67.90*	475.18*	1933.7*
	14	0.90	1.54*	3.34*	4.85*	7.95*	15.06*	47.21*	77.28*	183.58*	1300.1*	5301.3*
200	8	0.79	1.32*	2.57*	3.33*	4.25*	5.43*	10.12*	15.54*	35.53*	244.34*	991.34*
	10	0.87	1.46*	2.94*	3.91*	5.19*	7.14*	18.00*	29.03*	67.90*	475.18*	1933.7*
	14	1.01	1.73*	3.74*	5.34*	8.27*	15.07*	47.21*	77.28*	183.58*	1300.1*	5301.3*
250	8	0.86	1.44*	2.82*	3.65*	4.64*	5.89*	10.44*	15.58*	35.53*	244.34*	991.34*
	10	0.95	1.61*	3.23*	4.28*	5.64*	7.61*	18.01*	29.03*	67.90*	475.18*	1933.7*
	14	1.11	1.91*	4.11*	5.80*	8.66*	15.10*	47.21*	77.28*	183.58*	1300.1*	5301.3*
300	8	0.93	1.56*	3.05*	3.95*	5.00*	6.32*	10.81*	15.68*	35.53*	244.34*	991.34*
	10	1.03	1.74*	3.50*	4.63*	6.05*	8.07*	18.04*	29.03*	67.90*	475.18*	1933.7*
	14	1.20	2.08*	4.45*	6.22*	9.08*	15.18*	47.21*	77.28*	183.58*	1300.1*	5301.3*
350	8	0.99	1.66*	3.26*	4.22*	5.34*	6.72*	11.22*	15.85*	35.53*	244.34*	991.34*
	10	1.10	1.86*	3.75*	4.94*	6.44*	8.50*	18.12*	29.03*	67.90*	475.18*	1933.7*
	14	1.29	2.23*	4.76*	6.62*	9.50*	15.33*	47.21*	77.28*	183.58*	1300.1*	5301.3*
400	8	1.05	1.76*	3.46*	4.48*	5.66*	7.09*	11.63*	16.07*	35.53*	244.34*	991.34*
	10	1.16	1.98*	3.98*	5.24*	6.81*	8.92*	18.23*	29.03*	67.90*	475.18*	1933.7*
	14	1.37	2.37*	5.05*	6.99*	9.91*	15.53*	47.21*	77.28*	183.58*	1300.1*	5301.3*
450	8	1.10	1.86*	3.66*	4.72*	5.96*	7.45*	12.04*	16.35*	35.53*	244.34*	991.34*
	10	1.23	2.09*	4.20*	5.53*	7.16*	9.32*	18.40*	29.04*	67.90*	475.18*	1933.7*
	14	1.45	2.51*	5.33*	7.35*	10.31*	15.77*	47.21*	77.28*	183.58*	1300.1*	5301.3*
500	8	1.16	1.95*	3.84*	4.95*	6.24*	7.79*	12.44*	16.65*	35.53*	244.34*	991.34*
	10	1.29	2.19*	4.42*	5.80*	7.49*	9.71*	18.61*	29.05*	67.90*	475.18*	1933.7*
	14	1.53	2.64*	5.60*	7.69*	10.70*	16.05*	47.21*	77.28*	183.58*	1300.1*	5301.3*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.5 m (RADIUS = 0.4 m)
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}	°C/min											
550	8	1.21	2.04*	4.01*	5.18*	6.52*	8.12*	12.84*	16.97*	35.54*	244.34*	991.34*
	10	1.35	2.29*	4.62*	6.06*	7.81*	10.08*	18.86*	29.08*	67.90*	475.18*	1933.7*
	14	1.60	2.77*	5.86*	8.02*	11.08*	16.36*	47.21*	77.28*	183.58*	1300.1*	5301.3*
600	8	1.26	2.12*	4.18*	5.39*	6.78*	8.43*	13.23*	17.31*	35.55*	244.34*	991.34*
	10	1.40	2.39*	4.82*	6.31*	8.12*	10.44*	19.13*	29.12*	67.90*	475.18*	1933.7*
	14	1.67	2.89*	6.10*	8.33*	11.45*	16.67*	47.21*	77.28*	183.58*	1300.1*	5301.3*
650	8	1.31	2.20*	4.34*	5.60*	7.04*	8.74*	13.61*	17.66*	35.56*	244.34*	991.34*
	10	1.46	2.48*	5.00*	6.55*	8.42*	10.79*	19.42*	29.18*	67.90*	475.18*	1933.7*
	14	1.74	3.00*	6.34*	8.63*	11.81*	17.00*	47.21*	77.28*	183.58*	1300.1*	5301.3*
700	8	1.35	2.28*	4.50*	5.80*	7.29*	9.03*	13.98*	18.01*	35.59*	244.34*	991.34*
	10	1.51	2.57*	5.19*	6.79*	8.71*	11.13*	19.72*	29.27*	67.90*	475.18*	1933.7*
	14	1.80	3.12*	6.57*	8.93*	12.16*	17.33*	47.21*	77.28*	183.58*	1300.1*	5301.3*
750	8	1.40	2.36*	4.65*	5.99*	7.53*	9.32*	14.34*	18.36*	35.63*	244.34*	991.34*
	10	1.56	2.66*	5.36*	7.02*	8.99*	11.46*	20.04*	29.37*	67.90*	475.18*	1933.7*
	14	1.87	3.23*	6.80*	9.22*	12.50*	17.67*	47.21*	77.28*	183.58*	1300.1*	5301.3*
800	8	1.44	2.43*	4.80*	6.18*	7.76*	9.60*	14.70*	18.71*	35.68*	244.34*	991.34*
	10	1.61	2.75*	5.54*	7.24*	9.26*	11.79*	20.36*	29.49*	67.90*	475.18*	1933.7*
	14	1.93	3.33*	7.01*	9.49*	12.83*	18.00*	47.21*	77.28*	183.58*	1300.1*	5301.3*
850	8	1.48	2.51*	4.95*	6.37*	7.99*	9.87*	15.05*	19.06*	35.74*	244.34*	991.34*
	10	1.66	2.83*	5.70*	7.45*	9.52*	12.10*	20.68*	29.64*	67.90*	475.18*	1933.7*
	14	1.99	3.44*	7.22*	9.77*	13.16*	18.34*	47.22*	77.28*	183.58*	1300.1*	5301.3*
900	8	1.52	2.58*	5.09*	6.55*	8.21*	10.13*	15.39*	19.41*	35.83*	244.34*	991.34*
	10	1.71	2.92*	5.87*	7.66*	9.78*	12.41*	21.01*	29.81*	67.90*	475.18*	1933.7*
	14	2.05	3.54*	7.43*	10.03*	13.48*	18.67*	47.22*	77.28*	183.58*	1300.1*	5301.3*
950	8	1.56	2.65*	5.22*	6.72*	8.42*	10.39*	15.73*	19.76*	35.92*	244.34*	991.34*
	10	1.76	3.00*	6.03*	7.87*	10.04*	12.70*	21.34*	29.99*	67.90*	475.18*	1933.7*
	14	2.10	3.64*	7.63*	10.29*	13.79*	19.01*	47.23*	77.28*	183.58*	1300.1*	5301.3*
1000	8	1.60	2.72*	5.36*	6.90*	8.63*	10.65*	16.06*	20.10*	36.04*	244.34*	991.34*
	10	1.80	3.07*	6.18*	8.07*	10.28*	13.00*	21.66*	30.19*	67.90*	475.18*	1933.7*
	14	2.16	3.74*	7.83*	10.54*	14.10*	19.34*	47.25*	77.28*	183.58*	1300.1*	5301.3*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.0 m (RADIUS = 0.7 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		(m*s) ^{1/2}										
		1	2	4	5	6	7	9	10	12	18	24
50	8	0.20	0.27	0.42*	0.50*	0.57*	0.64*	0.79*	0.86*	1.01*	1.46*	1.96*
	10	0.20	0.28	0.44*	0.52*	0.59*	0.67*	0.83*	0.90*	1.06*	1.56*	2.17*
	14	0.21	0.30	0.46*	0.55*	0.63*	0.72*	0.89*	0.98*	1.16*	1.79*	2.80*
100	8	0.22	0.30	0.47*	0.56*	0.64*	0.73*	0.90*	0.99*	1.16*	1.70*	2.30*
	10	0.23	0.31	0.50*	0.59*	0.68*	0.77*	0.95*	1.05*	1.23*	1.84*	2.56*
	14	0.24	0.34	0.54*	0.64*	0.74*	0.84*	1.05*	1.16*	1.38*	2.14*	3.23*
150	8	0.24	0.33	0.51*	0.61*	0.70*	0.80*	0.99*	1.09*	1.28*	1.89*	2.57*
	10	0.25	0.34	0.54*	0.64*	0.75*	0.85*	1.06*	1.16*	1.37*	2.06*	2.87*
	14	0.27	0.37	0.59*	0.71*	0.82*	0.94*	1.18*	1.30*	1.56*	2.42*	3.60*
200	8	0.25	0.35	0.55*	0.65*	0.76*	0.86*	1.07*	1.17*	1.38*	2.05*	2.80*
	10	0.27	0.37	0.58*	0.69*	0.81*	0.92*	1.15*	1.26*	1.50*	2.25*	3.14*
	14	0.29	0.40	0.64*	0.77*	0.90*	1.03*	1.29*	1.43*	1.71*	2.67*	3.94*
250	8	0.27	0.37	0.58*	0.69*	0.80*	0.91*	1.14*	1.25*	1.48*	2.20*	3.01*
	10	0.28	0.39	0.62*	0.74*	0.86*	0.98*	1.23*	1.35*	1.61*	2.43*	3.38*
	14	0.31	0.43	0.69*	0.83*	0.96*	1.10*	1.39*	1.54*	1.85*	2.88*	4.24*
300	8	0.28	0.38	0.61*	0.73*	0.85*	0.96*	1.20*	1.32*	1.57*	2.34*	3.20*
	10	0.30	0.41	0.65*	0.78*	0.91*	1.04*	1.30*	1.43*	1.71*	2.59*	3.61*
	14	0.33	0.45	0.73*	0.88*	1.03*	1.18*	1.48*	1.64*	1.97*	3.08*	4.52*
350	8	0.29	0.40	0.64*	0.76*	0.89*	1.01*	1.26*	1.39*	1.65*	2.47*	3.37*
	10	0.31	0.43	0.69*	0.82*	0.96*	1.09*	1.37*	1.51*	1.80*	2.73*	3.81*
	14	0.34	0.48	0.77*	0.93*	1.08*	1.24*	1.57*	1.74*	2.09*	3.27*	4.78*
400	8	0.30	0.41	0.67*	0.79*	0.92*	1.06*	1.32*	1.45*	1.72*	2.59*	3.54*
	10	0.32	0.44	0.72*	0.86*	1.00*	1.14*	1.44*	1.58*	1.89*	2.87*	4.01*
	14	0.36	0.50	0.81*	0.97*	1.14*	1.30*	1.65*	1.83*	2.20*	3.44*	5.03*
450	8	0.31	0.43	0.69*	0.83*	0.96*	1.10*	1.37*	1.51*	1.80*	2.70*	3.70*
	10	0.33	0.46	0.74*	0.89*	1.04*	1.19*	1.50*	1.65*	1.97*	3.01*	4.20*
	14	0.37	0.52	0.84*	1.01*	1.19*	1.36*	1.73*	1.92*	2.30*	3.61*	5.26*
500	8	0.32	0.44	0.71*	0.85*	1.00*	1.14*	1.42*	1.57*	1.87*	2.81*	3.85*
	10	0.35	0.48	0.77*	0.93*	1.08*	1.24*	1.56*	1.72*	2.05*	3.13*	4.37*
	14	0.39	0.54	0.88*	1.05*	1.24*	1.42*	1.80*	2.00*	2.40*	3.77*	5.48*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.0 m (RADIUS = 0.7 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	0.33	0.46	0.74*	0.88*	1.03*	1.18*	1.47*	1.63*	1.93*	2.91*	4.00*
	10	0.36	0.49	0.80*	0.96*	1.12*	1.28*	1.61*	1.78*	2.13*	3.25*	4.54*
	14	0.40	0.56	0.91*	1.09*	1.28*	1.48*	1.87*	2.08*	2.50*	3.92*	5.70*
600	8	0.34	0.47	0.76*	0.91*	1.06*	1.21*	1.52*	1.68*	2.00*	3.01*	4.14*
	10	0.37	0.51	0.82*	0.99*	1.16*	1.32*	1.67*	1.85*	2.21*	3.37*	4.70*
	14	0.42	0.57	0.94*	1.13*	1.33*	1.53*	1.94*	2.15*	2.59*	4.07*	5.90*
650	8	0.35	0.48	0.78*	0.94*	1.09*	1.25*	1.57*	1.73*	2.06*	3.11*	4.27*
	10	0.38	0.52	0.85*	1.02*	1.19*	1.37*	1.72*	1.90*	2.28*	3.48*	4.86*
	14	0.43	0.59	0.97*	1.17*	1.37*	1.58*	2.01*	2.23*	2.68*	4.21*	6.10*
700	8	0.36	0.49	0.80*	0.96*	1.12*	1.28*	1.61*	1.78*	2.12*	3.20*	4.40*
	10	0.39	0.54	0.87*	1.05*	1.23*	1.41*	1.77*	1.96*	2.35*	3.59*	5.01*
	14	0.44	0.61	1.00*	1.20*	1.41*	1.63*	2.07*	2.30*	2.77*	4.35*	6.29*
750	8	0.37	0.51	0.82*	0.99*	1.15*	1.32*	1.66*	1.83*	2.18*	3.30*	4.53*
	10	0.40	0.55	0.89*	1.08*	1.26*	1.44*	1.82*	2.02*	2.41*	3.70*	5.16*
	14	0.45	0.63	1.03*	1.24*	1.46*	1.68*	2.13*	2.37*	2.85*	4.48*	6.48*
800	8	0.38	0.52	0.84*	1.01*	1.18*	1.35*	1.70*	1.88*	2.24*	3.38*	4.65*
	10	0.41	0.56	0.92*	1.10*	1.29*	1.48*	1.87*	2.07*	2.48*	3.80*	5.31*
	14	0.47	0.64	1.05*	1.27*	1.50*	1.72*	2.19*	2.43*	2.93*	4.61*	6.66*
850	8	0.38	0.53	0.86*	1.03*	1.21*	1.38*	1.74*	1.92*	2.29*	3.47*	4.77*
	10	0.42	0.58	0.94*	1.13*	1.32*	1.52*	1.92*	2.12*	2.54*	3.90*	5.45*
	14	0.48	0.66	1.08*	1.31*	1.54*	1.77*	2.25*	2.50*	3.01*	4.73*	6.84*
900	8	0.39	0.54	0.88*	1.06*	1.23*	1.41*	1.78*	1.97*	2.35*	3.56*	4.89*
	10	0.43	0.59	0.96*	1.16*	1.35*	1.56*	1.97*	2.18*	2.61*	4.00*	5.58*
	14	0.49	0.67	1.11*	1.34*	1.57*	1.81*	2.31*	2.56*	3.09*	4.86*	7.01*
950	8	0.40	0.55	0.90*	1.08*	1.26*	1.44*	1.82*	2.01*	2.40*	3.64*	5.01*
	10	0.44	0.60	0.98*	1.18*	1.38*	1.59*	2.01*	2.23*	2.67*	4.09*	5.72*
	14	0.50	0.69	1.13*	1.37*	1.61*	1.86*	2.36*	2.63*	3.17*	4.98*	7.18*
1000	8	0.41	0.56	0.91*	1.10*	1.29*	1.47*	1.86*	2.05*	2.45*	3.72*	5.12*
	10	0.44	0.61	1.00*	1.21*	1.41*	1.63*	2.06*	2.28*	2.73*	4.19*	5.85*
	14	0.51	0.70	1.16*	1.40*	1.65*	1.90*	2.42*	2.69*	3.24*	5.09*	7.34*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.0 m (RADIUS = 0.7 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE RATE
TIME INDEX OF RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C/min	1	2	4	5	6	7	9	10	12	18	24
50	8	0.29	0.40	0.63*	0.75*	0.87*	0.99*	1.23*	1.36*	1.64*	2.72*	5.81*
	10	0.30	0.42	0.66*	0.79*	0.92*	1.05*	1.33*	1.48*	1.80*	3.47*	9.86*
	14	0.32	0.45	0.72*	0.87*	1.02*	1.18*	1.52*	1.72*	2.21*	7.00*	24.32*
100	8	0.33	0.46	0.73*	0.88*	1.02*	1.17*	1.47*	1.62*	1.96*	3.21*	5.92*
	10	0.35	0.49	0.78*	0.94*	1.10*	1.26*	1.60*	1.78*	2.17*	3.91*	9.86*
	14	0.38	0.53	0.87*	1.05*	1.24*	1.44*	1.86*	2.11*	2.67*	7.01*	24.32*
150	8	0.37	0.51	0.82*	0.98*	1.14*	1.31*	1.65*	1.83*	2.21*	3.62*	6.23*
	10	0.39	0.54	0.88*	1.06*	1.24*	1.42*	1.81*	2.02*	2.47*	4.35*	9.87*
	14	0.43	0.60	0.99*	1.20*	1.41*	1.64*	2.14*	2.41*	3.04*	7.13*	24.32*
200	8	0.40	0.55	0.89*	1.07*	1.25*	1.43*	1.81*	2.01*	2.43*	3.97*	6.61*
	10	0.43	0.59	0.96*	1.16*	1.36*	1.57*	2.00*	2.23*	2.73*	4.75*	9.94*
	14	0.48	0.66	1.09*	1.33*	1.57*	1.82*	2.37*	2.68*	3.37*	7.36*	24.32*
250	8	0.43	0.59	0.96*	1.15*	1.34*	1.54*	1.96*	2.18*	2.63*	4.29*	6.99*
	10	0.46	0.63	1.04*	1.25*	1.47*	1.70*	2.17*	2.42*	2.96*	5.12*	10.10*
	14	0.52	0.72	1.19*	1.44*	1.71*	1.98*	2.59*	2.92*	3.66*	7.67*	24.32*
300	8	0.45	0.62	1.02*	1.22*	1.43*	1.65*	2.09*	2.33*	2.82*	4.59*	7.36*
	10	0.49	0.67	1.11*	1.34*	1.57*	1.81*	2.33*	2.60*	3.18*	5.45*	10.32*
	14	0.55	0.77	1.27*	1.55*	1.83*	2.13*	2.78*	3.14*	3.93*	7.99*	24.32*
350	8	0.48	0.66	1.07*	1.29*	1.51*	1.74*	2.22*	2.47*	2.99*	4.86*	7.72*
	10	0.51	0.71	1.17*	1.41*	1.67*	1.92*	2.47*	2.76*	3.38*	5.77*	10.59*
	14	0.59	0.81	1.35*	1.64*	1.95*	2.27*	2.96*	3.34*	4.19*	8.33*	24.32*
400	8	0.50	0.69	1.12*	1.36*	1.59*	1.83*	2.34*	2.60*	3.15*	5.12*	8.06*
	10	0.54	0.75	1.23*	1.49*	1.76*	2.03*	2.61*	2.91*	3.56*	6.07*	10.88*
	14	0.62	0.86	1.43*	1.74*	2.06*	2.40*	3.13*	3.53*	4.42*	8.65*	24.32*
450	8	0.52	0.72	1.18*	1.42*	1.67*	1.92*	2.45*	2.72*	3.30*	5.36*	8.39*
	10	0.56	0.78	1.29*	1.56*	1.84*	2.13*	2.74*	3.06*	3.74*	6.35*	11.18*
	14	0.65	0.90	1.50*	1.83*	2.17*	2.52*	3.29*	3.71*	4.65*	8.98*	24.32*
500	8	0.54	0.75	1.22*	1.48*	1.74*	2.00*	2.55*	2.84*	3.45*	5.59*	8.71*
	10	0.59	0.81	1.34*	1.63*	1.92*	2.22*	2.86*	3.20*	3.91*	6.62*	11.48*
	14	0.68	0.94	1.57*	1.91*	2.27*	2.64*	3.45*	3.89*	4.86*	9.29*	24.33*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.0 m (RADIUS = 0.7 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		(m*s) ^{1/2}										
		1	2	4	5	6	7	9	10	12	18	24
550	8	0.56	0.77	1.27*	1.53*	1.80*	2.08*	2.66*	2.96*	3.59*	5.82*	9.01*
	10	0.61	0.85	1.40*	1.69*	2.00*	2.31*	2.98*	3.33*	4.07*	6.88*	11.79*
	14	0.70	0.98	1.63*	1.99*	2.36*	2.76*	3.60*	4.05*	5.07*	9.60*	24.34*
600	8	0.58	0.80	1.31*	1.59*	1.87*	2.16*	2.76*	3.07*	3.72*	6.03*	9.31*
	10	0.63	0.88	1.45*	1.76*	2.08*	2.40*	3.09*	3.46*	4.23*	7.13*	12.09*
	14	0.73	1.01	1.70*	2.07*	2.46*	2.86*	3.74*	4.22*	5.26*	9.90*	24.37*
650	8	0.60	0.82	1.36*	1.64*	1.93*	2.23*	2.85*	3.17*	3.85*	6.24*	9.60*
	10	0.65	0.90	1.50*	1.82*	2.15*	2.49*	3.20*	3.58*	4.38*	7.38*	12.39*
	14	0.76	1.05	1.76*	2.14*	2.55*	2.97*	3.88*	4.37*	5.45*	10.19*	24.41*
700	8	0.61	0.85	1.40*	1.69*	1.99*	2.30*	2.94*	3.28*	3.98*	6.44*	9.87*
	10	0.67	0.93	1.55*	1.88*	2.22*	2.57*	3.31*	3.70*	4.53*	7.61*	12.69*
	14	0.78	1.08	1.82*	2.22*	2.64*	3.07*	4.01*	4.52*	5.64*	10.47*	24.46*
750	8	0.63	0.87	1.44*	1.74*	2.05*	2.37*	3.03*	3.38*	4.10*	6.64*	10.14*
	10	0.69	0.96	1.59*	1.93*	2.29*	2.65*	3.41*	3.81*	4.67*	7.84*	12.98*
	14	0.81	1.12	1.87*	2.29*	2.72*	3.17*	4.14*	4.67*	5.82*	10.75*	24.52*
800	8	0.65	0.90	1.48*	1.79*	2.11*	2.44*	3.12*	3.48*	4.22*	6.83*	10.41*
	10	0.71	0.99	1.64*	1.99*	2.35*	2.73*	3.51*	3.93*	4.81*	8.06*	13.27*
	14	0.83	1.15	1.93*	2.36*	2.80*	3.27*	4.27*	4.81*	5.99*	11.02*	24.61*
850	8	0.66	0.92	1.52*	1.84*	2.17*	2.50*	3.20*	3.57*	4.34*	7.01*	10.67*
	10	0.73	1.01	1.68*	2.04*	2.42*	2.80*	3.61*	4.04*	4.94*	8.27*	13.55*
	14	0.85	1.18	1.98*	2.42*	2.88*	3.36*	4.39*	4.94*	6.16*	11.28*	24.70*
900	8	0.68	0.94	1.56*	1.88*	2.22*	2.57*	3.29*	3.66*	4.45*	7.19*	10.92*
	10	0.75	1.04	1.73*	2.10*	2.48*	2.88*	3.71*	4.14*	5.07*	8.48*	13.83*
	14	0.87	1.21	2.04*	2.49*	2.96*	3.45*	4.51*	5.08*	6.33*	11.54*	24.82*
950	8	0.70	0.96	1.59*	1.93*	2.28*	2.63*	3.37*	3.75*	4.56*	7.37*	11.16*
	10	0.77	1.06	1.77*	2.15*	2.54*	2.95*	3.80*	4.25*	5.20*	8.69*	14.10*
	14	0.90	1.24	2.09*	2.55*	3.04*	3.54*	4.63*	5.21*	6.49*	11.80*	24.95*
1000	8	0.71	0.98	1.63*	1.97*	2.33*	2.69*	3.45*	3.84*	4.67*	7.54*	11.40*
	10	0.79	1.09	1.81*	2.20*	2.60*	3.02*	3.89*	4.35*	5.33*	8.89*	14.37*
	14	0.92	1.27	2.14*	2.62*	3.11*	3.63*	4.74*	5.34*	6.64*	12.04*	25.09*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.0 m (RADIUS = 0.7 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	0.44	0.62	1.00*	1.21*	1.43*	1.68*	2.26*	2.64*	3.87*	18.80*	69.99*
	10	0.47	0.65	1.08*	1.32*	1.58*	1.88*	2.70*	3.38*	6.20*	35.15*	134.73*
	14	0.51	0.72	1.24*	1.55*	1.92*	2.42*	4.64*	6.96*	14.88*	93.56*	366.10*
100	8	0.53	0.74	1.22*	1.48*	1.76*	2.06*	2.75*	3.18*	4.36*	18.80*	69.99*
	10	0.57	0.79	1.33*	1.63*	1.96*	2.32*	3.25*	3.91*	6.29*	35.15*	134.73*
	14	0.64	0.90	1.55*	1.94*	2.39*	2.96*	4.90*	6.99*	14.88*	93.56*	366.10*
150	8	0.60	0.84	1.39*	1.69*	2.01*	2.36*	3.15*	3.63*	4.86*	18.80*	69.99*
	10	0.65	0.91	1.53*	1.88*	2.26*	2.68*	3.71*	4.40*	6.59*	35.15*	134.73*
	14	0.74	1.04	1.80*	2.25*	2.77*	3.40*	5.33*	7.17*	14.88*	93.56*	366.10*
200	8	0.66	0.92	1.54*	1.88*	2.24*	2.62*	3.50*	4.02*	5.32*	18.81*	69.99*
	10	0.72	1.01	1.70*	2.09*	2.52*	2.98*	4.11*	4.84*	6.99*	35.15*	134.73*
	14	0.83	1.16	2.01*	2.52*	3.10*	3.78*	5.76*	7.48*	14.88*	93.56*	366.10*
250	8	0.72	1.00	1.67*	2.04*	2.44*	2.86*	3.81*	4.37*	5.74*	18.81*	69.99*
	10	0.78	1.10	1.85*	2.29*	2.75*	3.26*	4.48*	5.24*	7.40*	35.15*	134.73*
	14	0.90	1.27	2.21*	2.76*	3.39*	4.13*	6.18*	7.85*	14.90*	93.56*	366.10*
300	8	0.77	1.07	1.79*	2.20*	2.62*	3.08*	4.10*	4.69*	6.13*	18.82*	69.99*
	10	0.84	1.18	2.00*	2.46*	2.96*	3.51*	4.81*	5.61*	7.81*	35.15*	134.73*
	14	0.98	1.37	2.39*	2.99*	3.66*	4.45*	6.58*	8.23*	14.95*	93.56*	366.10*
350	8	0.82	1.14	1.91*	2.34*	2.79*	3.28*	4.37*	4.99*	6.49*	18.85*	69.99*
	10	0.90	1.25	2.13*	2.63*	3.16*	3.75*	5.12*	5.96*	8.20*	35.15*	134.73*
	14	1.04	1.47	2.55*	3.20*	3.92*	4.74*	6.96*	8.61*	15.04*	93.56*	366.10*
400	8	0.86	1.20	2.02*	2.47*	2.96*	3.47*	4.62*	5.27*	6.84*	18.91*	69.99*
	10	0.95	1.33	2.26*	2.79*	3.35*	3.97*	5.41*	6.29*	8.58*	35.15*	134.73*
	14	1.11	1.56	2.71*	3.39*	4.15*	5.02*	7.32*	8.98*	15.18*	93.56*	366.10*
450	8	0.91	1.26	2.12*	2.60*	3.11*	3.65*	4.85*	5.54*	7.16*	19.01*	69.99*
	10	1.00	1.40	2.38*	2.93*	3.53*	4.18*	5.69*	6.60*	8.95*	35.15*	134.73*
	14	1.17	1.64	2.86*	3.58*	4.38*	5.29*	7.66*	9.34*	15.36*	93.56*	366.10*
500	8	0.95	1.32	2.22*	2.72*	3.26*	3.82*	5.08*	5.80*	7.48*	19.15*	69.99*
	10	1.05	1.46	2.49*	3.07*	3.70*	4.38*	5.96*	6.90*	9.30*	35.15*	134.73*
	14	1.23	1.72	3.00*	3.75*	4.59*	5.54*	7.99*	9.69*	15.58*	93.56*	366.10*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.0 m (RADIUS = 0.7 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE RATE
TIME INDEX OF RISE

CEILING HEIGHT, m

(m*s)^{1/2} °C/min

	1	2	4	5	6	7	9	10	12	18	24
550	0.99	1.37	2.32*	2.84*	3.40*	3.99*	5.30*	6.04*	7.78*	19.32*	69.99*
	1.09	1.52	2.60*	3.21*	3.87*	4.57*	6.21*	7.18*	9.64*	35.15*	134.73*
	1.28	1.80	3.14*	3.92*	4.80*	5.79*	8.30*	10.03*	15.83*	93.56*	366.10*
600	1.02	1.43	2.41*	2.95*	3.53*	4.15*	5.51*	6.28*	8.07*	19.52*	69.99*
	1.14	1.58	2.71*	3.34*	4.02*	4.76*	6.45*	7.46*	9.97*	35.15*	134.73*
	1.34	1.88	3.27*	4.09*	5.00*	6.02*	8.61*	10.36*	16.09*	93.56*	366.10*
650	1.06	1.48	2.50*	3.06*	3.66*	4.30*	5.71*	6.50*	8.35*	19.74*	69.99*
	1.18	1.64	2.81*	3.47*	4.17*	4.94*	6.69*	7.72*	10.29*	35.16*	134.73*
	1.39	1.95	3.40*	4.25*	5.19*	6.25*	8.90*	10.69*	16.37*	93.56*	366.10*
700	1.10	1.53	2.58*	3.17*	3.79*	4.45*	5.91*	6.72*	8.62*	19.98*	69.99*
	1.22	1.70	2.91*	3.59*	4.32*	5.11*	6.92*	7.98*	10.60*	35.17*	134.73*
	1.44	2.02	3.52*	4.40*	5.37*	6.46*	9.19*	11.00*	16.66*	93.56*	366.10*
750	1.13	1.57	2.66*	3.27*	3.91*	4.59*	6.10*	6.94*	8.88*	20.24*	69.99*
	1.26	1.76	3.00*	3.71*	4.46*	5.28*	7.14*	8.23*	10.91*	35.18*	134.73*
	1.49	2.09	3.64*	4.55*	5.55*	6.68*	9.47*	11.31*	16.95*	93.56*	366.10*
800	1.17	1.62	2.75*	3.37*	4.03*	4.73*	6.28*	7.15*	9.14*	20.51*	69.99*
	1.30	1.81	3.10*	3.82*	4.60*	5.44*	7.36*	8.47*	11.20*	35.20*	134.73*
	1.54	2.15	3.75*	4.69*	5.73*	6.88*	9.74*	11.61*	17.24*	93.56*	366.10*
850	1.20	1.67	2.82*	3.47*	4.15*	4.87*	6.46*	7.35*	9.38*	20.78*	69.99*
	1.34	1.86	3.19*	3.94*	4.74*	5.60*	7.57*	8.71*	11.49*	35.24*	134.73*
	1.58	2.22	3.87*	4.83*	5.90*	7.08*	10.00*	11.90*	17.54*	93.56*	366.10*
900	1.23	1.71	2.90*	3.56*	4.26*	5.00*	6.63*	7.55*	9.63*	21.06*	69.99*
	1.37	1.91	3.27*	4.05*	4.87*	5.76*	7.77*	8.94*	11.77*	35.28*	134.73*
	1.63	2.28	3.98*	4.97*	6.06*	7.28*	10.26*	12.18*	17.83*	93.56*	366.10*
950	1.26	1.76	2.98*	3.66*	4.37*	5.13*	6.81*	7.74*	9.86*	21.35*	69.99*
	1.41	1.96	3.36*	4.15*	5.00*	5.91*	7.97*	9.16*	12.04*	35.33*	134.73*
	1.67	2.34	4.09*	5.10*	6.22*	7.47*	10.51*	12.46*	18.13*	93.56*	366.10*
1000	1.29	1.80	3.05*	3.75*	4.48*	5.26*	6.97*	7.93*	10.10*	21.64*	69.99*
	1.44	2.01	3.45*	4.26*	5.13*	6.06*	8.17*	9.38*	12.31*	35.39*	134.73*
	1.72	2.40	4.19*	5.24*	6.38*	7.65*	10.76*	12.74*	18.42*	93.56*	366.10*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.0 m (RADIUS = 0.7 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE
 TIME INDEX

RATE
 OF RISE

°C/min

CEILING HEIGHT, m

(m*s)^{1/2}

	1	2	4	5	6	7	9	10	12	18	24
50	0.71 0.77 0.87	1.01 1.10 1.29	1.79* 2.06* 2.83*	2.33* 2.87* 5.27*	3.13* 4.52* 10.59*	4.66* 7.98* 19.99*	12.18* 22.56* 59.62*	19.00* 35.76* 95.67*	42.38* 81.25* 220.13*	276.55* 538.04* 1472.6*	1089.5* 2125.4* 5827.2*
100	0.89 0.97 1.13	1.26 1.40 1.66	2.25* 2.59* 3.44*	2.90* 3.49* 5.51*	3.76* 4.95* 10.59*	5.10* 8.01* 19.99*	12.18* 22.56* 59.62*	19.00* 35.76* 95.67*	42.38* 81.25* 220.13*	276.55* 538.04* 1472.6*	1089.5* 2125.4* 5827.2*
150	1.03 1.14 1.33	1.47 1.63 1.95	2.62* 3.02* 3.97*	3.36* 4.02* 5.96*	4.30* 5.48* 10.62*	5.64* 8.20* 19.99*	12.20* 22.56* 59.62*	19.00* 35.76* 95.67*	42.38* 81.25* 220.13*	276.55* 538.04* 1472.6*	1089.5* 2125.4* 5827.2*
200	1.16 1.28 1.51	1.65 1.84 2.21	2.93* 3.39* 4.43*	3.76* 4.48* 6.45*	4.78* 6.00* 10.74*	6.16* 8.55* 19.99*	12.27* 22.56* 59.62*	19.00* 35.76* 95.67*	42.38* 81.25* 220.13*	276.55* 538.04* 1472.6*	1089.5* 2125.4* 5827.2*
250	1.27 1.41 1.67	1.80 2.02 2.44	3.22* 3.72* 4.84*	4.12* 4.89* 6.92*	5.21* 6.47* 10.97*	6.64* 8.97* 19.99*	12.45* 22.56* 59.62*	19.01* 35.76* 95.67*	42.38* 81.25* 220.13*	276.55* 538.04* 1472.6*	1089.5* 2125.4* 5827.2*
300	1.38 1.53 1.82	1.95 2.19 2.65	3.48* 4.03* 5.23*	4.44* 5.28* 7.37*	5.61* 6.92* 11.27*	7.10* 9.40* 20.00*	12.72* 22.56* 59.62*	19.03* 35.76* 95.67*	42.38* 81.25* 220.13*	276.55* 538.04* 1472.6*	1089.5* 2125.4* 5827.2*
350	1.47 1.65 1.96	2.09 2.35 2.85	3.72* 4.31* 5.59*	4.75* 5.63* 7.80*	5.98* 7.34* 11.62*	7.52* 9.84* 20.03*	13.04* 22.57* 59.62*	19.10* 35.76* 95.67*	42.38* 81.25* 220.13*	276.55* 538.04* 1472.6*	1089.5* 2125.4* 5827.2*
400	1.57 1.75 2.09	2.22 2.50 3.03	3.95* 4.58* 5.92*	5.04* 5.97* 8.21*	6.32* 7.74* 12.00*	7.93* 10.26* 20.09*	13.40* 22.61* 59.62*	19.21* 35.76* 95.67*	42.38* 81.25* 220.13*	276.55* 538.04* 1472.6*	1089.5* 2125.4* 5827.2*
450	1.65 1.85 2.22	2.34 2.64 3.21	4.17* 4.83* 6.24*	5.31* 6.29* 8.60*	6.65* 8.12* 12.38*	8.31* 10.68* 20.19*	13.78* 22.66* 59.62*	19.36* 35.76* 95.67*	42.39* 81.25* 220.13*	276.55* 538.04* 1472.6*	1089.5* 2125.4* 5827.2*
500	1.74 1.95 2.33	2.46 2.78 3.38	4.38* 5.08* 6.55*	5.57* 6.59* 8.98*	6.97* 8.49* 12.76*	8.68* 11.08* 20.33*	14.16* 22.76* 59.62*	19.56* 35.76* 95.67*	42.39* 81.25* 220.13*	276.55* 538.04* 1472.6*	1089.5* 2125.4* 5827.2*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.0 m (RADIUS = 0.7 m)
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	1.82	2.57	4.58*	5.82*	7.27*	9.04*	14.55*	19.80*	42.39*	276.55*	1089.5*
	10	2.04	2.91	5.31*	6.88*	8.84*	11.48*	22.88*	35.77*	81.25*	538.04*	2125.4*
	14	2.45	3.54	6.84*	9.34*	13.14*	20.50*	59.62*	95.67*	220.13*	1472.6*	5827.2*
600	8	1.89	2.68	4.77*	6.06*	7.56*	9.38*	14.94*	20.07*	42.39*	276.55*	1089.5*
	10	2.13	3.03	5.53*	7.16*	9.18*	11.86*	23.04*	35.78*	81.25*	538.04*	2125.4*
	14	2.56	3.70	7.12*	9.69*	13.52*	20.71*	59.62*	95.67*	220.13*	1472.6*	5827.2*
650	8	1.97	2.78	4.95*	6.29*	7.84*	9.71*	15.32*	20.36*	42.39*	276.55*	1089.5*
	10	2.21	3.15	5.75*	7.43*	9.50*	12.23*	23.23*	35.79*	81.25*	538.04*	2125.4*
	14	2.66	3.85	7.40*	10.02*	13.89*	20.94*	59.62*	95.67*	220.13*	1472.6*	5827.2*
700	8	2.04	2.88	5.13*	6.52*	8.12*	10.03*	15.70*	20.66*	42.40*	276.55*	1089.5*
	10	2.30	3.27	5.96*	7.69*	9.82*	12.59*	23.45*	35.81*	81.25*	538.04*	2125.4*
	14	2.77	3.99	7.66*	10.35*	14.26*	21.19*	59.62*	95.67*	220.13*	1472.6*	5827.2*
750	8	2.11	2.98	5.31*	6.73*	8.38*	10.34*	16.07*	20.98*	42.40*	276.55*	1089.5*
	10	2.38	3.38	6.16*	7.95*	10.12*	12.94*	23.69*	35.84*	81.25*	538.04*	2125.4*
	14	2.87	4.13	7.91*	10.67*	14.62*	21.46*	59.62*	95.67*	220.13*	1472.6*	5827.2*
800	8	2.18	3.08	5.48*	6.95*	8.64*	10.64*	16.43*	21.30*	42.42*	276.55*	1089.5*
	10	2.46	3.49	6.36*	8.19*	10.42*	13.29*	23.94*	35.89*	81.25*	538.04*	2125.4*
	14	2.96	4.27	8.16*	10.98*	14.97*	21.75*	59.62*	95.67*	220.13*	1472.6*	5827.2*
850	8	2.25	3.17	5.64*	7.15*	8.88*	10.93*	16.79*	21.63*	42.44*	276.55*	1089.5*
	10	2.53	3.60	6.55*	8.43*	10.71*	13.63*	24.21*	35.95*	81.25*	538.04*	2125.4*
	14	3.06	4.41	8.41*	11.28*	15.32*	22.04*	59.62*	95.67*	220.13*	1472.6*	5827.2*
900	8	2.31	3.26	5.80*	7.35*	9.13*	11.22*	17.15*	21.96*	42.47*	276.55*	1089.5*
	10	2.61	3.71	6.73*	8.67*	11.00*	13.95*	24.49*	36.02*	81.25*	538.04*	2125.4*
	14	3.15	4.54	8.64*	11.58*	15.66*	22.34*	59.62*	95.67*	220.13*	1472.6*	5827.2*
950	8	2.38	3.35	5.96*	7.55*	9.37*	11.50*	17.50*	22.29*	42.51*	276.55*	1089.5*
	10	2.68	3.81	6.92*	8.90*	11.28*	14.28*	24.78*	36.11*	81.25*	538.04*	2125.4*
	14	3.24	4.67	8.87*	11.86*	15.99*	22.64*	59.62*	95.67*	220.13*	1472.6*	5827.2*
1000	8	2.44	3.44	6.11*	7.74*	9.60*	11.78*	17.84*	22.63*	42.56*	276.55*	1089.5*
	10	2.75	3.91	7.10*	9.12*	11.55*	14.59*	25.08*	36.22*	81.25*	538.04*	2125.4*
	14	3.33	4.79	9.10*	12.15*	16.32*	22.95*	59.62*	95.67*	220.13*	1472.6*	5827.2*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.5 m (RADIUS = 1.1 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE RATE
 TIME INDEX OF RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C/min	1	2	4	5	6	7	9	10	12	18	24
50	8	0.24	0.32	0.46*	0.53*	0.61*	0.68*	0.82*	0.90*	1.04*	1.50*	2.01*
	10	0.25	0.33	0.48*	0.55*	0.63*	0.71*	0.86*	0.94*	1.10*	1.61*	2.23*
	14	0.27	0.35	0.51*	0.59*	0.68*	0.76*	0.94*	1.03*	1.21*	1.85*	2.92*
100	8	0.27	0.35	0.52*	0.60*	0.69*	0.77*	0.94*	1.03*	1.20*	1.74*	2.35*
	10	0.29	0.37	0.54*	0.63*	0.72*	0.81*	1.00*	1.09*	1.28*	1.89*	2.62*
	14	0.31	0.40	0.59*	0.69*	0.79*	0.89*	1.10*	1.21*	1.44*	2.21*	3.34*
150	8	0.30	0.39	0.56*	0.66*	0.75*	0.85*	1.04*	1.13*	1.33*	1.94*	2.63*
	10	0.31	0.41	0.59*	0.69*	0.80*	0.90*	1.11*	1.21*	1.43*	2.12*	2.94*
	14	0.34	0.44	0.65*	0.77*	0.88*	1.00*	1.24*	1.36*	1.62*	2.50*	3.72*
200	8	0.32	0.41	0.60*	0.70*	0.81*	0.91*	1.12*	1.22*	1.44*	2.11*	2.86*
	10	0.34	0.44	0.64*	0.75*	0.86*	0.97*	1.20*	1.32*	1.56*	2.32*	3.22*
	14	0.37	0.48	0.71*	0.83*	0.96*	1.09*	1.36*	1.50*	1.78*	2.75*	4.07*
250	8	0.34	0.44	0.64*	0.75*	0.86*	0.97*	1.19*	1.31*	1.54*	2.26*	3.08*
	10	0.36	0.46	0.68*	0.80*	0.92*	1.04*	1.29*	1.41*	1.67*	2.50*	3.47*
	14	0.40	0.52	0.76*	0.89*	1.03*	1.17*	1.46*	1.61*	1.92*	2.98*	4.38*
300	8	0.36	0.46	0.67*	0.79*	0.90*	1.02*	1.26*	1.38*	1.63*	2.41*	3.27*
	10	0.38	0.49	0.72*	0.84*	0.97*	1.10*	1.37*	1.50*	1.78*	2.66*	3.70*
	14	0.42	0.55	0.80*	0.95*	1.10*	1.25*	1.56*	1.72*	2.06*	3.19*	4.66*
350	8	0.37	0.48	0.70*	0.82*	0.95*	1.07*	1.33*	1.45*	1.71*	2.54*	3.46*
	10	0.40	0.51	0.75*	0.89*	1.02*	1.16*	1.44*	1.58*	1.87*	2.82*	3.91*
	14	0.45	0.58	0.85*	1.00*	1.16*	1.32*	1.65*	1.82*	2.18*	3.38*	4.93*
400	8	0.39	0.50	0.73*	0.86*	0.99*	1.12*	1.39*	1.52*	1.79*	2.66*	3.63*
	10	0.42	0.54	0.79*	0.93*	1.07*	1.22*	1.51*	1.66*	1.97*	2.96*	4.11*
	14	0.47	0.60	0.89*	1.05*	1.22*	1.39*	1.74*	1.92*	2.29*	3.56*	5.18*
450	8	0.40	0.52	0.76*	0.89*	1.03*	1.17*	1.44*	1.58*	1.87*	2.78*	3.79*
	10	0.43	0.56	0.82*	0.97*	1.12*	1.27*	1.58*	1.73*	2.06*	3.10*	4.30*
	14	0.49	0.63	0.93*	1.10*	1.28*	1.45*	1.82*	2.01*	2.40*	3.73*	5.42*
500	8	0.42	0.54	0.78*	0.92*	1.07*	1.21*	1.50*	1.64*	1.94*	2.89*	3.95*
	10	0.45	0.58	0.85*	1.00*	1.16*	1.32*	1.64*	1.80*	2.14*	3.23*	4.49*
	14	0.51	0.66	0.97*	1.15*	1.33*	1.52*	1.90*	2.10*	2.51*	3.90*	5.65*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.5 m (RADIUS = 1.1 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	0.43	0.55	0.81*	0.96*	1.10*	1.25*	1.55*	1.70*	2.01*	3.00*	4.09*
	10	0.46	0.60	0.88*	1.04*	1.20*	1.36*	1.70*	1.87*	2.22*	3.35*	4.66*
	14	0.53	0.68	1.00*	1.19*	1.38*	1.57*	1.97*	2.18*	2.61*	4.05*	5.87*
600	8	0.44	0.57	0.83*	0.98*	1.14*	1.29*	1.60*	1.76*	2.08*	3.10*	4.24*
	10	0.48	0.62	0.91*	1.07*	1.24*	1.41*	1.76*	1.93*	2.30*	3.47*	4.83*
	14	0.55	0.70	1.04*	1.23*	1.43*	1.63*	2.05*	2.26*	2.71*	4.20*	6.08*
650	8	0.46	0.59	0.86*	1.01*	1.17*	1.33*	1.65*	1.81*	2.15*	3.20*	4.38*
	10	0.49	0.64	0.93*	1.11*	1.28*	1.45*	1.81*	2.00*	2.37*	3.59*	4.99*
	14	0.56	0.73	1.07*	1.27*	1.48*	1.69*	2.12*	2.34*	2.80*	4.35*	6.28*
700	8	0.47	0.60	0.88*	1.04*	1.20*	1.37*	1.70*	1.87*	2.21*	3.30*	4.51*
	10	0.51	0.65	0.96*	1.14*	1.32*	1.50*	1.87*	2.06*	2.45*	3.70*	5.14*
	14	0.58	0.75	1.10*	1.31*	1.52*	1.74*	2.18*	2.41*	2.89*	4.49*	6.48*
750	8	0.48	0.62	0.90*	1.07*	1.23*	1.40*	1.74*	1.92*	2.27*	3.39*	4.64*
	10	0.52	0.67	0.99*	1.17*	1.35*	1.54*	1.92*	2.12*	2.52*	3.81*	5.30*
	14	0.60	0.77	1.13*	1.35*	1.57*	1.79*	2.25*	2.49*	2.98*	4.63*	6.67*
800	8	0.49	0.63	0.93*	1.09*	1.27*	1.44*	1.79*	1.97*	2.33*	3.49*	4.77*
	10	0.53	0.69	1.01*	1.20*	1.39*	1.58*	1.97*	2.17*	2.59*	3.92*	5.44*
	14	0.61	0.79	1.16*	1.39*	1.61*	1.84*	2.31*	2.56*	3.07*	4.76*	6.86*
850	8	0.50	0.65	0.95*	1.12*	1.30*	1.47*	1.83*	2.02*	2.39*	3.58*	4.89*
	10	0.55	0.71	1.03*	1.23*	1.42*	1.62*	2.02*	2.23*	2.65*	4.02*	5.59*
	14	0.63	0.81	1.19*	1.42*	1.65*	1.89*	2.38*	2.63*	3.15*	4.89*	7.04*
900	8	0.51	0.66	0.97*	1.14*	1.32*	1.51*	1.87*	2.06*	2.45*	3.66*	5.01*
	10	0.56	0.72	1.06*	1.26*	1.46*	1.66*	2.07*	2.28*	2.72*	4.12*	5.73*
	14	0.64	0.83	1.22*	1.46*	1.69*	1.94*	2.44*	2.69*	3.23*	5.02*	7.22*
950	8	0.52	0.67	0.99*	1.17*	1.35*	1.54*	1.92*	2.11*	2.50*	3.75*	5.13*
	10	0.57	0.74	1.08*	1.28*	1.49*	1.70*	2.12*	2.34*	2.78*	4.22*	5.86*
	14	0.66	0.85	1.25*	1.49*	1.73*	1.98*	2.50*	2.76*	3.31*	5.14*	7.39*
1000	8	0.53	0.69	1.01*	1.19*	1.38*	1.57*	1.96*	2.15*	2.56*	3.83*	5.24*
	10	0.58	0.75	1.10*	1.31*	1.52*	1.73*	2.17*	2.39*	2.85*	4.32*	6.00*
	14	0.67	0.87	1.28*	1.52*	1.77*	2.03*	2.55*	2.83*	3.39*	5.26*	7.56*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.5 m (RADIUS = 1.1 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE
TIME INDEX

RATE
OF RISE

(m*s)^{1/2}

°C/min

1

2

4

5

6

7

9

10

12

18

24

CEILING HEIGHT, m

50	8	0.36	0.47	0.69*	0.81*	0.93*	1.05*	1.30*	1.43*	1.70*	2.04*	2.31*	2.75*	3.34*	4.13*	5.04*	6.04*
	10	0.38	0.49	0.73*	0.85*	0.98*	1.12*	1.40*	1.55*	1.87*	2.28*	2.59*	3.11*	3.76*	4.57*	5.35*	6.25*
	14	0.41	0.54	0.79*	0.94*	1.09*	1.26*	1.62*	1.83*	2.23*	2.83*	3.22*	3.87*	4.76*	5.70*	6.62*	7.62*
100	8	0.42	0.55	0.80*	0.95*	1.09*	1.24*	1.54*	1.70*	2.04*	2.31*	2.75*	3.34*	4.13*	5.04*	6.04*	7.04*
	10	0.45	0.58	0.86*	1.01*	1.17*	1.34*	1.69*	1.87*	2.28*	2.59*	3.11*	3.76*	4.57*	5.35*	6.25*	7.25*
	14	0.50	0.64	0.96*	1.14*	1.33*	1.54*	1.98*	2.23*	2.83*	3.22*	3.87*	4.76*	5.70*	6.62*	7.62*	8.62*
150	8	0.47	0.61	0.90*	1.06*	1.22*	1.39*	1.74*	1.92*	2.31*	2.75*	3.22*	3.87*	4.76*	5.70*	6.62*	7.62*
	10	0.50	0.65	0.97*	1.14*	1.33*	1.52*	1.92*	2.13*	2.59*	3.11*	3.56*	4.27*	5.16*	6.04*	7.04*	8.04*
	14	0.56	0.73	1.09*	1.30*	1.53*	1.76*	2.27*	2.56*	3.22*	3.87*	4.57*	5.35*	6.25*	7.25*	8.25*	9.25*
200	8	0.51	0.66	0.98*	1.16*	1.34*	1.53*	1.91*	2.12*	2.54*	3.04*	3.54*	4.24*	5.13*	6.02*	7.02*	8.02*
	10	0.55	0.72	1.06*	1.26*	1.46*	1.67*	2.12*	2.35*	2.86*	3.36*	3.86*	4.56*	5.45*	6.35*	7.35*	8.35*
	14	0.62	0.81	1.21*	1.44*	1.69*	1.95*	2.52*	2.84*	3.56*	4.27*	5.05*	5.83*	6.83*	7.83*	8.83*	9.83*
250	8	0.55	0.71	1.05*	1.24*	1.44*	1.65*	2.07*	2.29*	2.75*	3.25*	3.75*	4.45*	5.34*	6.24*	7.24*	8.24*
	10	0.60	0.77	1.14*	1.36*	1.58*	1.81*	2.29*	2.55*	3.11*	3.61*	4.11*	4.81*	5.70*	6.60*	7.60*	8.60*
	14	0.68	0.88	1.31*	1.57*	1.84*	2.13*	2.75*	3.09*	3.87*	4.57*	5.27*	6.07*	7.07*	8.07*	9.07*	10.07*
300	8	0.59	0.76	1.12*	1.33*	1.54*	1.76*	2.21*	2.45*	2.95*	3.45*	3.95*	4.65*	5.54*	6.44*	7.44*	8.44*
	10	0.64	0.82	1.22*	1.45*	1.69*	1.94*	2.46*	2.74*	3.33*	3.83*	4.33*	5.03*	5.92*	6.82*	7.82*	8.82*
	14	0.73	0.94	1.41*	1.69*	1.98*	2.29*	2.95*	3.32*	4.15*	4.85*	5.55*	6.35*	7.35*	8.35*	9.35*	10.35*
350	8	0.62	0.80	1.18*	1.40*	1.63*	1.86*	2.34*	2.59*	3.13*	3.63*	4.13*	4.83*	5.72*	6.62*	7.62*	8.62*
	10	0.67	0.87	1.29*	1.54*	1.79*	2.06*	2.61*	2.91*	3.54*	4.04*	4.54*	5.24*	6.13*	7.03*	8.03*	9.03*
	14	0.77	1.00	1.50*	1.80*	2.11*	2.44*	3.15*	3.54*	4.42*	5.12*	5.82*	6.72*	7.72*	8.72*	9.72*	10.72*
400	8	0.65	0.84	1.24*	1.47*	1.71*	1.96*	2.47*	2.73*	3.29*	3.79*	4.29*	5.00*	5.89*	6.79*	7.79*	8.79*
	10	0.71	0.92	1.36*	1.62*	1.89*	2.17*	2.76*	3.07*	3.74*	4.24*	4.74*	5.44*	6.33*	7.23*	8.23*	9.23*
	14	0.82	1.06	1.58*	1.90*	2.23*	2.58*	3.33*	3.74*	4.62*	5.32*	6.02*	6.92*	7.92*	8.92*	9.92*	10.92*
450	8	0.68	0.88	1.30*	1.54*	1.79*	2.05*	2.59*	2.87*	3.45*	3.95*	4.45*	5.15*	6.04*	6.94*	7.94*	8.94*
	10	0.74	0.96	1.42*	1.70*	1.98*	2.28*	2.90*	3.22*	3.93*	4.43*	4.93*	5.63*	6.52*	7.42*	8.42*	9.42*
	14	0.86	1.11	1.66*	1.99*	2.34*	2.71*	3.50*	3.93*	4.81*	5.51*	6.21*	7.11*	8.11*	9.11*	10.11*	11.11*
500	8	0.71	0.91	1.35*	1.61*	1.87*	2.14*	2.70*	2.99*	3.61*	4.11*	4.61*	5.31*	6.20*	7.10*	8.10*	9.10*
	10	0.77	1.00	1.49*	1.78*	2.07*	2.38*	3.03*	3.37*	4.10*	4.60*	5.10*	5.80*	6.69*	7.59*	8.59*	9.59*
	14	0.90	1.16	1.74*	2.09*	2.45*	2.84*	3.67*	4.12*	5.00*	5.70*	6.40*	7.30*	8.30*	9.30*	10.30*	11.30*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.5 m (RADIUS = 1.1 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	0.73	0.95	1.40*	1.67*	1.94*	2.22*	2.81*	3.11*	3.75*	6.03*	9.35*
	10	0.81	1.04	1.55*	1.85*	2.16*	2.48*	3.15*	3.51*	4.27*	7.17*	12.40*
	14	0.93	1.21	1.81*	2.18*	2.56*	2.96*	3.82*	4.29*	5.34*	10.16*	26.56*
600	8	0.76	0.98	1.45*	1.73*	2.01*	2.30*	2.91*	3.23*	3.90*	6.26*	9.65*
	10	0.84	1.08	1.60*	1.92*	2.24*	2.57*	3.27*	3.64*	4.44*	7.43*	12.70*
	14	0.97	1.26	1.88*	2.26*	2.66*	3.08*	3.97*	4.46*	5.55*	10.46*	26.57*
650	8	0.79	1.02	1.50*	1.79*	2.08*	2.38*	3.01*	3.34*	4.03*	6.47*	9.95*
	10	0.86	1.12	1.66*	1.98*	2.32*	2.66*	3.39*	3.78*	4.60*	7.68*	13.00*
	14	1.01	1.30	1.95*	2.35*	2.76*	3.19*	4.12*	4.63*	5.75*	10.75*	26.59*
700	8	0.81	1.05	1.55*	1.84*	2.15*	2.46*	3.11*	3.45*	4.16*	6.68*	10.23*
	10	0.89	1.15	1.71*	2.05*	2.39*	2.75*	3.50*	3.90*	4.75*	7.92*	13.29*
	14	1.04	1.35	2.02*	2.43*	2.85*	3.30*	4.26*	4.79*	5.94*	11.04*	26.62*
750	8	0.83	1.08	1.59*	1.90*	2.21*	2.53*	3.21*	3.56*	4.29*	6.88*	10.51*
	10	0.92	1.19	1.76*	2.11*	2.47*	2.84*	3.61*	4.02*	4.90*	8.16*	13.58*
	14	1.07	1.39	2.08*	2.50*	2.95*	3.41*	4.40*	4.94*	6.13*	11.32*	26.66*
800	8	0.86	1.11	1.64*	1.95*	2.28*	2.61*	3.30*	3.66*	4.42*	7.08*	10.78*
	10	0.95	1.22	1.81*	2.17*	2.54*	2.92*	3.72*	4.14*	5.04*	8.39*	13.87*
	14	1.11	1.43	2.14*	2.58*	3.03*	3.51*	4.54*	5.09*	6.31*	11.60*	26.71*
850	8	0.88	1.14	1.68*	2.00*	2.34*	2.68*	3.39*	3.76*	4.54*	7.27*	11.04*
	10	0.97	1.26	1.86*	2.23*	2.61*	3.00*	3.82*	4.26*	5.18*	8.61*	14.16*
	14	1.14	1.47	2.20*	2.65*	3.12*	3.61*	4.67*	5.24*	6.49*	11.87*	26.78*
900	8	0.90	1.16	1.72*	2.05*	2.40*	2.75*	3.48*	3.86*	4.66*	7.45*	11.30*
	10	1.00	1.29	1.91*	2.29*	2.68*	3.08*	3.93*	4.37*	5.32*	8.83*	14.44*
	14	1.17	1.51	2.26*	2.73*	3.21*	3.71*	4.79*	5.38*	6.66*	12.14*	26.86*
950	8	0.92	1.19	1.76*	2.10*	2.45*	2.81*	3.56*	3.95*	4.77*	7.64*	11.55*
	10	1.02	1.32	1.96*	2.35*	2.75*	3.16*	4.03*	4.48*	5.46*	9.04*	14.71*
	14	1.20	1.55	2.32*	2.80*	3.29*	3.81*	4.92*	5.52*	6.83*	12.40*	26.96*
1000	8	0.94	1.22	1.80*	2.15*	2.51*	2.88*	3.65*	4.05*	4.89*	7.81*	11.80*
	10	1.05	1.35	2.01*	2.40*	2.81*	3.23*	4.12*	4.59*	5.59*	9.25*	14.99*
	14	1.23	1.59	2.38*	2.87*	3.37*	3.90*	5.04*	5.65*	7.00*	12.65*	27.07*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.5 m (RADIUS = 1.1 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	0.56	0.73	1.10*	1.32*	1.55*	1.80*	2.43*	2.85*	4.34*	21.04*	76.60*	
	10	0.60	0.78	1.19*	1.44*	1.72*	2.04*	2.98*	3.83*	7.18*	39.49*	147.61*	
	14	0.67	0.88	1.38*	1.72*	2.14*	2.73*	5.59*	8.34*	17.52*	105.40*	401.38*	
100	8	0.68	0.89	1.34*	1.61*	1.90*	2.21*	2.95*	3.41*	4.75*	21.04*	76.60*	
	10	0.74	0.97	1.47*	1.79*	2.13*	2.52*	3.54*	4.30*	7.22*	39.49*	147.61*	
	14	0.84	1.10	1.73*	2.15*	2.65*	3.28*	5.72*	8.34*	17.52*	105.40*	401.38*	
150	8	0.78	1.02	1.54*	1.85*	2.18*	2.54*	3.38*	3.88*	5.25*	21.04*	76.60*	
	10	0.85	1.11	1.70*	2.06*	2.46*	2.90*	4.02*	4.79*	7.42*	39.49*	147.61*	
	14	0.98	1.29	2.01*	2.49*	3.06*	3.75*	6.06*	8.42*	17.52*	105.40*	401.38*	
200	8	0.87	1.13	1.70*	2.05*	2.42*	2.82*	3.75*	4.29*	5.71*	21.04*	76.60*	
	10	0.95	1.24	1.89*	2.30*	2.74*	3.23*	4.45*	5.25*	7.75*	39.49*	147.61*	
	14	1.10	1.44	2.26*	2.79*	3.42*	4.16*	6.47*	8.62*	17.52*	105.40*	401.38*	
250	8	0.94	1.23	1.85*	2.24*	2.64*	3.08*	4.08*	4.66*	6.14*	21.04*	76.60*	
	10	1.04	1.35	2.06*	2.51*	3.00*	3.53*	4.83*	5.67*	8.14*	39.49*	147.61*	
	14	1.20	1.59	2.47*	3.06*	3.74*	4.54*	6.88*	8.92*	17.52*	105.40*	401.38*	
300	8	1.01	1.32	1.99*	2.40*	2.84*	3.31*	4.38*	5.01*	6.55*	21.04*	76.60*	
	10	1.12	1.46	2.23*	2.71*	3.23*	3.80*	5.18*	6.06*	8.53*	39.49*	147.61*	
	14	1.30	1.72	2.68*	3.31*	4.03*	4.88*	7.29*	9.26*	17.54*	105.40*	401.38*	
350	8	1.08	1.41	2.12*	2.56*	3.03*	3.53*	4.67*	5.32*	6.93*	21.06*	76.60*	
	10	1.19	1.56	2.37*	2.89*	3.45*	4.06*	5.52*	6.42*	8.92*	39.49*	147.61*	
	14	1.40	1.84	2.86*	3.54*	4.31*	5.20*	7.67*	9.62*	17.57*	105.40*	401.38*	
400	8	1.14	1.49	2.24*	2.71*	3.21*	3.74*	4.93*	5.62*	7.29*	21.09*	76.60*	
	10	1.26	1.65	2.52*	3.06*	3.65*	4.30*	5.83*	6.77*	9.31*	39.49*	147.61*	
	14	1.49	1.95	3.04*	3.76*	4.57*	5.50*	8.05*	9.98*	17.64*	105.40*	401.38*	
450	8	1.20	1.56	2.36*	2.85*	3.37*	3.93*	5.19*	5.91*	7.63*	21.14*	76.60*	
	10	1.33	1.74	2.65*	3.23*	3.85*	4.53*	6.12*	7.09*	9.68*	39.49*	147.61*	
	14	1.57	2.06	3.21*	3.96*	4.81*	5.79*	8.41*	10.34*	17.75*	105.40*	401.38*	
500	8	1.26	1.64	2.47*	2.99*	3.53*	4.12*	5.43*	6.18*	7.96*	21.22*	76.60*	
	10	1.40	1.82	2.78*	3.38*	4.03*	4.74*	6.40*	7.41*	10.04*	39.49*	147.61*	
	14	1.65	2.17	3.37*	4.16*	5.05*	6.06*	8.75*	10.70*	17.89*	105.40*	401.38*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.5 m (RADIUS = 1.1 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	1.31	1.71	2.58*	3.12*	3.69*	4.30*	5.66*	6.44*	8.27*	21.34*	76.60*
	10	1.46	1.91	2.90*	3.53*	4.21*	4.95*	6.67*	7.71*	10.39*	39.49*	147.61*
	14	1.73	2.27	3.52*	4.35*	5.27*	6.33*	9.08*	11.04*	18.06*	105.40*	401.38*
600	8	1.37	1.78	2.68*	3.24*	3.84*	4.47*	5.88*	6.69*	8.57*	21.48*	76.60*
	10	1.52	1.98	3.02*	3.68*	4.38*	5.15*	6.93*	8.00*	10.73*	39.49*	147.61*
	14	1.80	2.36	3.67*	4.53*	5.49*	6.58*	9.40*	11.38*	18.26*	105.40*	401.38*
650	8	1.42	1.84	2.78*	3.36*	3.98*	4.63*	6.10*	6.93*	8.87*	21.66*	76.60*
	10	1.58	2.06	3.13*	3.82*	4.55*	5.34*	7.19*	8.28*	11.06*	39.49*	147.61*
	14	1.87	2.46	3.81*	4.70*	5.69*	6.82*	9.71*	11.72*	18.49*	105.40*	401.38*
700	8	1.47	1.91	2.87*	3.48*	4.12*	4.79*	6.31*	7.16*	9.15*	21.85*	76.60*
	10	1.63	2.13	3.24*	3.95*	4.71*	5.53*	7.43*	8.55*	11.39*	39.49*	147.61*
	14	1.94	2.55	3.95*	4.87*	5.90*	7.06*	10.02*	12.04*	18.73*	105.40*	401.38*
750	8	1.51	1.97	2.97*	3.59*	4.25*	4.95*	6.51*	7.39*	9.43*	22.07*	76.60*
	10	1.69	2.20	3.35*	4.08*	4.86*	5.71*	7.66*	8.82*	11.70*	39.50*	147.61*
	14	2.01	2.64	4.08*	5.03*	6.09*	7.29*	10.31*	12.36*	18.99*	105.40*	401.38*
800	8	1.56	2.03	3.06*	3.70*	4.38*	5.10*	6.70*	7.61*	9.69*	22.30*	76.60*
	10	1.74	2.27	3.46*	4.21*	5.02*	5.89*	7.89*	9.07*	12.01*	39.50*	147.61*
	14	2.07	2.72	4.21*	5.19*	6.28*	7.51*	10.60*	12.67*	19.25*	105.40*	401.38*
850	8	1.61	2.09	3.14*	3.81*	4.51*	5.25*	6.90*	7.82*	9.96*	22.55*	76.60*
	10	1.79	2.34	3.56*	4.33*	5.16*	6.06*	8.12*	9.32*	12.31*	39.52*	147.61*
	14	2.14	2.80	4.34*	5.35*	6.47*	7.73*	10.88*	12.97*	19.52*	105.40*	401.38*
900	8	1.65	2.14	3.23*	3.91*	4.63*	5.39*	7.08*	8.03*	10.21*	22.80*	76.60*
	10	1.85	2.41	3.66*	4.45*	5.31*	6.23*	8.33*	9.57*	12.60*	39.53*	147.61*
	14	2.20	2.89	4.46*	5.50*	6.65*	7.94*	11.15*	13.27*	19.80*	105.40*	401.38*
950	8	1.69	2.20	3.31*	4.01*	4.75*	5.53*	7.26*	8.23*	10.46*	23.06*	76.60*
	10	1.90	2.47	3.75*	4.57*	5.45*	6.39*	8.55*	9.81*	12.89*	39.56*	147.61*
	14	2.26	2.97	4.58*	5.65*	6.83*	8.14*	11.42*	13.56*	20.08*	105.40*	401.38*
1000	8	1.74	2.25	3.40*	4.11*	4.87*	5.67*	7.44*	8.43*	10.70*	23.33*	76.60*
	10	1.94	2.53	3.85*	4.69*	5.58*	6.55*	8.76*	10.04*	13.17*	39.59*	147.61*
	14	2.32	3.04	4.70*	5.79*	7.00*	8.35*	11.68*	13.85*	20.36*	105.40*	401.38*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.5 m (RADIUS = 1.1 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	0.93	1.24	2.03*	2.66*	3.69*	5.80*	14.98*	23.05*	50.22*	311.85*	1194.8*
	10	1.01	1.36	2.39*	3.45*	5.84*	10.24*	27.96*	43.64*	96.50*	606.97*	2331.0*
	14	1.16	1.62	3.61*	7.24*	14.21*	26.10*	74.37*	117.20*	261.92*	1661.6*	6391.3*
100	8	1.17	1.56	2.55*	3.28*	4.30*	6.04*	14.98*	23.05*	50.22*	311.85*	1194.8*
	10	1.29	1.74	2.98*	4.06*	6.04*	10.24*	27.96*	43.64*	96.50*	606.97*	2331.0*
	14	1.51	2.10	4.18*	7.29*	14.21*	26.10*	74.37*	117.20*	261.92*	1661.6*	6391.3*
150	8	1.37	1.83	2.96*	3.78*	4.87*	6.52*	14.98*	23.05*	50.22*	311.85*	1194.8*
	10	1.52	2.05	3.46*	4.62*	6.49*	10.29*	27.96*	43.64*	96.50*	606.97*	2331.0*
	14	1.80	2.48	4.73*	7.55*	14.21*	26.10*	74.37*	117.20*	261.92*	1661.6*	6391.3*
200	8	1.54	2.06	3.32*	4.22*	5.38*	7.02*	14.99*	23.05*	50.22*	311.85*	1194.8*
	10	1.72	2.31	3.88*	5.12*	6.98*	10.47*	27.96*	43.64*	96.50*	606.97*	2331.0*
	14	2.05	2.82	5.23*	7.94*	14.23*	26.10*	74.37*	117.20*	261.92*	1661.6*	6391.3*
250	8	1.70	2.26	3.64*	4.62*	5.84*	7.52*	15.06*	23.05*	50.22*	311.85*	1194.8*
	10	1.90	2.55	4.25*	5.58*	7.47*	10.76*	27.96*	43.64*	96.50*	606.97*	2331.0*
	14	2.27	3.12	5.70*	8.38*	14.29*	26.10*	74.37*	117.20*	261.92*	1661.6*	6391.3*
300	8	1.85	2.45	3.93*	4.98*	6.27*	7.99*	15.19*	23.06*	50.22*	311.85*	1194.8*
	10	2.07	2.77	4.60*	6.00*	7.94*	11.12*	27.96*	43.64*	96.50*	606.97*	2331.0*
	14	2.48	3.39	6.12*	8.82*	14.42*	26.10*	74.37*	117.20*	261.92*	1661.6*	6391.3*
350	8	1.98	2.63	4.21*	5.32*	6.67*	8.44*	15.40*	23.07*	50.22*	311.85*	1194.8*
	10	2.22	2.98	4.92*	6.39*	8.38*	11.51*	27.96*	43.64*	96.50*	606.97*	2331.0*
	14	2.67	3.65	6.52*	9.26*	14.62*	26.10*	74.37*	117.20*	261.92*	1661.6*	6391.3*
400	8	2.11	2.79	4.47*	5.64*	7.05*	8.87*	15.66*	23.11*	50.22*	311.85*	1194.8*
	10	2.37	3.17	5.22*	6.76*	8.81*	11.92*	27.97*	43.64*	96.50*	606.97*	2331.0*
	14	2.85	3.89	6.90*	9.69*	14.88*	26.11*	74.37*	117.20*	261.92*	1661.6*	6391.3*
450	8	2.23	2.95	4.71*	5.94*	7.41*	9.28*	15.96*	23.17*	50.22*	311.85*	1194.8*
	10	2.51	3.35	5.51*	7.11*	9.22*	12.32*	27.98*	43.64*	96.50*	606.97*	2331.0*
	14	3.02	4.12	7.26*	10.10*	15.17*	26.13*	74.37*	117.20*	261.92*	1661.6*	6391.3*
500	8	2.34	3.10	4.95*	6.23*	7.75*	9.67*	16.30*	23.27*	50.22*	311.85*	1194.8*
	10	2.64	3.53	5.78*	7.45*	9.61*	12.73*	28.00*	43.64*	96.50*	606.97*	2331.0*
	14	3.19	4.34	7.60*	10.50*	15.50*	26.16*	74.37*	117.20*	261.92*	1661.6*	6391.3*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 1.5 m (RADIUS = 1.1 m)
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	2.45	3.25	5.17*	6.50*	8.08*	10.05*	16.64*	23.40*	50.22*	311.85*	1194.8*
	10	2.77	3.69	6.04*	7.77*	9.99*	13.13*	28.04*	43.64*	96.50*	606.97*	2331.0*
	14	3.34	4.55	7.93*	10.89*	15.83*	26.21*	74.37*	117.20*	261.92*	1661.6*	6391.3*
600	8	2.56	3.39	5.39*	6.77*	8.40*	10.42*	17.00*	23.57*	50.22*	311.85*	1194.8*
	10	2.89	3.86	6.29*	8.08*	10.35*	13.52*	28.11*	43.64*	96.50*	606.97*	2331.0*
	14	3.50	4.75	8.25*	11.27*	16.18*	26.29*	74.37*	117.20*	261.92*	1661.6*	6391.3*
650	8	2.66	3.52	5.59*	7.02*	8.71*	10.77*	17.37*	23.76*	50.22*	311.85*	1194.8*
	10	3.01	4.01	6.53*	8.38*	10.70*	13.90*	28.19*	43.64*	96.50*	606.97*	2331.0*
	14	3.64	4.94	8.56*	11.63*	16.53*	26.39*	74.37*	117.20*	261.92*	1661.6*	6391.3*
700	8	2.76	3.65	5.80*	7.27*	9.00*	11.11*	17.73*	23.99*	50.22*	311.85*	1194.8*
	10	3.12	4.16	6.77*	8.67*	11.05*	14.28*	28.30*	43.64*	96.50*	606.97*	2331.0*
	14	3.78	5.13	8.85*	11.99*	16.89*	26.52*	74.37*	117.20*	261.92*	1661.6*	6391.3*
750	8	2.86	3.78	5.99*	7.51*	9.29*	11.45*	18.10*	24.23*	50.22*	311.85*	1194.8*
	10	3.23	4.31	7.00*	8.95*	11.38*	14.65*	28.43*	43.65*	96.50*	606.97*	2331.0*
	14	3.92	5.31	9.14*	12.33*	17.24*	26.67*	74.37*	117.20*	261.92*	1661.6*	6391.3*
800	8	2.95	3.91	6.18*	7.75*	9.57*	11.77*	18.46*	24.50*	50.22*	311.85*	1194.8*
	10	3.34	4.45	7.22*	9.22*	11.70*	15.01*	28.59*	43.66*	96.50*	606.97*	2331.0*
	14	4.06	5.49	9.42*	12.67*	17.60*	26.85*	74.37*	117.20*	261.92*	1661.6*	6391.3*
850	8	3.05	4.03	6.37*	7.98*	9.84*	12.09*	18.82*	24.78*	50.23*	311.85*	1194.8*
	10	3.45	4.59	7.44*	9.49*	12.02*	15.36*	28.77*	43.67*	96.50*	606.97*	2331.0*
	14	4.19	5.67	9.69*	13.00*	17.95*	27.05*	74.37*	117.20*	261.92*	1661.6*	6391.3*
900	8	3.14	4.14	6.55*	8.20*	10.11*	12.40*	19.18*	25.07*	50.24*	311.85*	1194.8*
	10	3.55	4.73	7.65*	9.75*	12.33*	15.71*	28.97*	43.70*	96.50*	606.97*	2331.0*
	14	4.32	5.83	9.96*	13.33*	18.29*	27.26*	74.37*	117.20*	261.92*	1661.6*	6391.3*
950	8	3.22	4.26	6.73*	8.42*	10.37*	12.70*	19.53*	25.36*	50.25*	311.85*	1194.8*
	10	3.65	4.86	7.85*	10.00*	12.63*	16.05*	29.18*	43.73*	96.50*	606.97*	2331.0*
	14	4.44	6.00	10.22*	13.64*	18.64*	27.49*	74.37*	117.20*	261.92*	1661.6*	6391.3*
1000	8	3.31	4.37	6.90*	8.63*	10.62*	13.00*	19.88*	25.67*	50.26*	311.85*	1194.8*
	10	3.75	4.99	8.05*	10.25*	12.93*	16.39*	29.41*	43.76*	96.50*	606.97*	2331.0*
	14	4.56	6.16	10.48*	13.95*	18.98*	27.73*	74.37*	117.20*	261.92*	1661.6*	6391.3*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 m (RADIUS = 1.4 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
		(m*s) ^{1/2}										
50	8	0.29	0.36	0.50	0.57*	0.64*	0.71*	0.86*	0.93*	1.08*	1.54*	2.05*
	10	0.30	0.37	0.52	0.59*	0.67*	0.74*	0.90*	0.98*	1.14*	1.65*	2.29*
	14	0.32	0.40	0.55	0.63*	0.72*	0.80*	0.98*	1.07*	1.26*	1.91*	3.06*
100	8	0.33	0.41	0.56	0.64*	0.73*	0.81*	0.98*	1.07*	1.24*	1.79*	2.40*
	10	0.35	0.43	0.59	0.68*	0.77*	0.86*	1.04*	1.14*	1.33*	1.95*	2.69*
	14	0.38	0.46	0.65	0.74*	0.84*	0.94*	1.16*	1.27*	1.50*	2.29*	3.47*
150	8	0.36	0.45	0.62	0.70*	0.80*	0.89*	1.08*	1.18*	1.38*	1.99*	2.69*
	10	0.38	0.47	0.65	0.74*	0.85*	0.95*	1.16*	1.27*	1.48*	2.18*	3.02*
	14	0.42	0.52	0.72	0.82*	0.94*	1.06*	1.30*	1.43*	1.69*	2.59*	3.85*
200	8	0.39	0.48	0.66	0.75*	0.86*	0.96*	1.17*	1.28*	1.49*	2.17*	2.93*
	10	0.41	0.51	0.70	0.80*	0.92*	1.03*	1.26*	1.38*	1.62*	2.39*	3.30*
	14	0.46	0.56	0.78	0.90*	1.03*	1.16*	1.43*	1.57*	1.85*	2.84*	4.20*
250	8	0.41	0.51	0.70	0.80*	0.91*	1.02*	1.25*	1.36*	1.59*	2.33*	3.15*
	10	0.44	0.54	0.75	0.86*	0.98*	1.10*	1.35*	1.48*	1.73*	2.57*	3.56*
	14	0.49	0.61	0.84	0.96*	1.10*	1.25*	1.54*	1.69*	2.00*	3.08*	4.51*
300	8	0.44	0.54	0.74	0.84*	0.96*	1.08*	1.32*	1.44*	1.69*	2.47*	3.35*
	10	0.47	0.57	0.80	0.91*	1.04*	1.17*	1.43*	1.57*	1.85*	2.74*	3.79*
	14	0.52	0.64	0.90	1.02*	1.17*	1.33*	1.64*	1.80*	2.14*	3.29*	4.81*
350	8	0.46	0.56	0.78	0.89*	1.01*	1.14*	1.39*	1.52*	1.78*	2.61*	3.54*
	10	0.49	0.60	0.84	0.96*	1.09*	1.23*	1.51*	1.65*	1.95*	2.90*	4.01*
	14	0.55	0.68	0.95	1.08*	1.24*	1.40*	1.74*	1.91*	2.27*	3.49*	5.08*
400	8	0.48	0.58	0.81	0.92*	1.05*	1.19*	1.45*	1.59*	1.86*	2.74*	3.71*
	10	0.51	0.63	0.87	1.00*	1.14*	1.29*	1.58*	1.74*	2.05*	3.05*	4.22*
	14	0.58	0.71	0.99	1.14*	1.30*	1.48*	1.83*	2.01*	2.39*	3.68*	5.34*
450	8	0.49	0.61	0.84	0.96*	1.10*	1.23*	1.51*	1.65*	1.94*	2.86*	3.88*
	10	0.53	0.66	0.91	1.04*	1.19*	1.34*	1.65*	1.81*	2.14*	3.19*	4.41*
	14	0.61	0.75	1.04	1.19*	1.36*	1.54*	1.92*	2.11*	2.51*	3.86*	5.58*
500	8	0.51	0.63	0.87	0.99*	1.14*	1.28*	1.57*	1.72*	2.02*	2.97*	4.04*
	10	0.56	0.68	0.95	1.08*	1.24*	1.40*	1.72*	1.89*	2.23*	3.33*	4.60*
	14	0.63	0.78	1.08	1.24*	1.42*	1.61*	2.00*	2.20*	2.62*	4.02*	5.82*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 m (RADIUS = 1.4 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	0.53	0.65	0.90	1.03*	1.18*	1.32*	1.63*	1.78*	2.09*	3.09*	4.19*
	10	0.58	0.71	0.98	1.12*	1.28*	1.45*	1.78*	1.96*	2.31*	3.45*	4.78*
	14	0.66	0.81	1.12	1.28*	1.48*	1.67*	2.08*	2.29*	2.72*	4.19*	6.04*
600	8	0.55	0.67	0.93	1.06*	1.21*	1.37*	1.68*	1.84*	2.16*	3.19*	4.34*
	10	0.59	0.73	1.01	1.16*	1.33*	1.50*	1.85*	2.03*	2.39*	3.58*	4.95*
	14	0.68	0.84	1.16	1.33*	1.53*	1.73*	2.15*	2.37*	2.82*	4.34*	6.26*
650	8	0.56	0.69	0.96	1.09*	1.25*	1.41*	1.73*	1.90*	2.23*	3.30*	4.48*
	10	0.61	0.75	1.04	1.19*	1.37*	1.54*	1.91*	2.09*	2.47*	3.70*	5.12*
	14	0.70	0.86	1.20	1.37*	1.58*	1.79*	2.23*	2.45*	2.92*	4.49*	6.47*
700	8	0.58	0.71	0.98	1.12*	1.28*	1.45*	1.78*	1.95*	2.30*	3.40*	4.62*
	10	0.63	0.77	1.07	1.23*	1.41*	1.59*	1.96*	2.15*	2.55*	3.82*	5.28*
	14	0.72	0.89	1.24	1.42*	1.63*	1.85*	2.30*	2.53*	3.02*	4.64*	6.67*
750	8	0.59	0.73	1.01	1.15*	1.32*	1.49*	1.83*	2.01*	2.36*	3.49*	4.75*
	10	0.65	0.80	1.10	1.26*	1.45*	1.63*	2.02*	2.22*	2.62*	3.93*	5.43*
	14	0.74	0.92	1.27	1.46*	1.68*	1.90*	2.37*	2.61*	3.11*	4.78*	6.87*
800	8	0.61	0.75	1.03	1.18*	1.35*	1.53*	1.88*	2.06*	2.42*	3.59*	4.88*
	10	0.66	0.82	1.13	1.29*	1.48*	1.68*	2.07*	2.28*	2.69*	4.04*	5.58*
	14	0.77	0.94	1.31	1.50*	1.73*	1.96*	2.44*	2.68*	3.20*	4.92*	7.06*
850	8	0.62	0.76	1.06	1.21*	1.38*	1.56*	1.92*	2.11*	2.48*	3.68*	5.01*
	10	0.68	0.84	1.16	1.32*	1.52*	1.72*	2.13*	2.34*	2.76*	4.14*	5.73*
	14	0.79	0.97	1.34	1.54*	1.77*	2.01*	2.50*	2.76*	3.28*	5.05*	7.24*
900	8	0.64	0.78	1.08	1.23*	1.42*	1.60*	1.97*	2.16*	2.54*	3.77*	5.13*
	10	0.70	0.86	1.19	1.36*	1.56*	1.76*	2.18*	2.39*	2.83*	4.25*	5.87*
	14	0.81	0.99	1.38	1.58*	1.82*	2.06*	2.57*	2.83*	3.37*	5.18*	7.43*
950	8	0.65	0.80	1.10	1.26*	1.45*	1.63*	2.01*	2.21*	2.60*	3.86*	5.25*
	10	0.71	0.88	1.21	1.39*	1.59*	1.80*	2.23*	2.45*	2.90*	4.35*	6.01*
	14	0.82	1.01	1.41	1.61*	1.86*	2.11*	2.63*	2.90*	3.45*	5.31*	7.60*
1000	8	0.66	0.81	1.13	1.29*	1.48*	1.67*	2.06*	2.25*	2.66*	3.94*	5.37*
	10	0.73	0.89	1.24	1.42*	1.63*	1.84*	2.28*	2.50*	2.96*	4.45*	6.15*
	14	0.84	1.04	1.44	1.65*	1.90*	2.16*	2.69*	2.97*	3.53*	5.44*	7.78*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 m (RADIUS = 1.4 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	0.44	0.54	0.76	0.86*	0.98*	1.11*	1.36*	1.49*	1.78*	2.97*	6.71*
	10	0.46	0.57	0.80	0.92*	1.05*	1.18*	1.47*	1.63*	1.97*	4.01*	11.57*
	14	0.50	0.62	0.88	1.01*	1.17*	1.34*	1.71*	1.94*	2.51*	8.59*	28.93*
100	8	0.52	0.64	0.89	1.02*	1.16*	1.31*	1.62*	1.78*	2.13*	3.48*	6.75*
	10	0.55	0.68	0.95	1.09*	1.25*	1.42*	1.78*	1.97*	2.38*	4.37*	11.57*
	14	0.61	0.76	1.07	1.24*	1.43*	1.64*	2.10*	2.36*	3.00*	8.59*	28.93*
150	8	0.58	0.71	0.99	1.14*	1.31*	1.48*	1.83*	2.02*	2.41*	3.91*	6.97*
	10	0.62	0.77	1.07	1.23*	1.42*	1.61*	2.02*	2.24*	2.71*	4.81*	11.57*
	14	0.70	0.86	1.22	1.41*	1.64*	1.88*	2.41*	2.70*	3.41*	8.63*	28.93*
200	8	0.63	0.78	1.09	1.25*	1.43*	1.62*	2.01*	2.22*	2.65*	4.29*	7.29*
	10	0.68	0.84	1.18	1.36*	1.56*	1.78*	2.23*	2.47*	3.00*	5.22*	11.59*
	14	0.77	0.96	1.35	1.57*	1.82*	2.09*	2.67*	3.00*	3.76*	8.75*	28.93*
250	8	0.68	0.84	1.17	1.34*	1.54*	1.75*	2.18*	2.40*	2.87*	4.63*	7.65*
	10	0.74	0.91	1.28	1.47*	1.69*	1.93*	2.42*	2.68*	3.25*	5.60*	11.66*
	14	0.84	1.04	1.47	1.70*	1.98*	2.27*	2.91*	3.27*	4.09*	8.96*	28.93*
300	8	0.73	0.89	1.25	1.43*	1.65*	1.87*	2.33*	2.57*	3.08*	4.94*	8.02*
	10	0.79	0.97	1.36	1.57*	1.81*	2.06*	2.60*	2.88*	3.49*	5.95*	11.80*
	14	0.90	1.12	1.58	1.83*	2.13*	2.44*	3.13*	3.51*	4.38*	9.22*	28.93*
350	8	0.77	0.95	1.32	1.51*	1.74*	1.98*	2.47*	2.72*	3.26*	5.23*	8.38*
	10	0.84	1.03	1.45	1.67*	1.92*	2.19*	2.76*	3.06*	3.71*	6.29*	12.00*
	14	0.96	1.19	1.68	1.95*	2.27*	2.60*	3.34*	3.74*	4.66*	9.52*	28.93*
400	8	0.81	0.99	1.39	1.59*	1.83*	2.08*	2.60*	2.87*	3.44*	5.51*	8.72*
	10	0.88	1.09	1.53	1.76*	2.03*	2.31*	2.91*	3.23*	3.91*	6.61*	12.23*
	14	1.02	1.26	1.78	2.06*	2.40*	2.76*	3.53*	3.96*	4.92*	9.83*	28.93*
450	8	0.84	1.04	1.45	1.67*	1.92*	2.18*	2.72*	3.01*	3.61*	5.77*	9.06*
	10	0.93	1.14	1.60	1.84*	2.13*	2.43*	3.06*	3.39*	4.11*	6.91*	12.50*
	14	1.07	1.33	1.87	2.17*	2.52*	2.90*	3.71*	4.16*	5.17*	10.14*	28.93*
500	8	0.88	1.08	1.51	1.74*	2.00*	2.28*	2.84*	3.14*	3.77*	6.02*	9.39*
	10	0.97	1.19	1.67	1.92*	2.22*	2.54*	3.20*	3.55*	4.30*	7.20*	12.77*
	14	1.12	1.39	1.96	2.27*	2.64*	3.03*	3.89*	4.35*	5.40*	10.45*	28.93*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 m (RADIUS = 1.4 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	0.92	1.13	1.57	1.81*	2.08*	2.37*	2.96*	3.27*	3.92*	6.26*	9.71*
	10	1.01	1.24	1.74	2.00*	2.32*	2.64*	3.33*	3.69*	4.48*	7.47*	13.06*
	14	1.17	1.45	2.05	2.37*	2.76*	3.17*	4.05*	4.54*	5.63*	10.76*	28.93*
600	8	0.95	1.17	1.63	1.87*	2.16*	2.45*	3.07*	3.39*	4.07*	6.49*	10.01*
	10	1.05	1.29	1.80	2.08*	2.40*	2.74*	3.46*	3.84*	4.65*	7.74*	13.35*
	14	1.22	1.51	2.13	2.46*	2.87*	3.29*	4.22*	4.72*	5.84*	11.06*	28.94*
650	8	0.98	1.21	1.68	1.93*	2.23*	2.54*	3.18*	3.51*	4.21*	6.71*	10.31*
	10	1.08	1.33	1.87	2.15*	2.49*	2.84*	3.58*	3.97*	4.81*	8.00*	13.64*
	14	1.26	1.56	2.20	2.55*	2.97*	3.41*	4.37*	4.89*	6.05*	11.36*	28.95*
700	8	1.01	1.25	1.74	2.00*	2.30*	2.62*	3.28*	3.63*	4.35*	6.92*	10.60*
	10	1.12	1.38	1.93	2.22*	2.57*	2.94*	3.70*	4.11*	4.97*	8.25*	13.94*
	14	1.31	1.62	2.28	2.64*	3.07*	3.53*	4.52*	5.06*	6.26*	11.65*	28.96*
750	8	1.04	1.28	1.79	2.06*	2.37*	2.70*	3.38*	3.74*	4.49*	7.13*	10.88*
	10	1.15	1.42	1.99	2.29*	2.65*	3.03*	3.82*	4.24*	5.13*	8.49*	14.23*
	14	1.35	1.67	2.35	2.72*	3.17*	3.65*	4.67*	5.22*	6.45*	11.94*	28.98*
800	8	1.07	1.32	1.84	2.11*	2.44*	2.78*	3.48*	3.85*	4.62*	7.33*	11.16*
	10	1.19	1.46	2.05	2.36*	2.73*	3.12*	3.93*	4.36*	5.28*	8.73*	14.51*
	14	1.39	1.72	2.43	2.81*	3.27*	3.76*	4.81*	5.38*	6.64*	12.22*	29.02*
850	8	1.10	1.36	1.89	2.17*	2.51*	2.85*	3.57*	3.95*	4.74*	7.53*	11.43*
	10	1.22	1.50	2.10	2.42*	2.81*	3.20*	4.04*	4.49*	5.43*	8.96*	14.80*
	14	1.43	1.77	2.50	2.89*	3.37*	3.87*	4.95*	5.54*	6.83*	12.50*	29.06*
900	8	1.13	1.39	1.94	2.23*	2.57*	2.93*	3.67*	4.05*	4.87*	7.72*	11.69*
	10	1.25	1.54	2.16	2.48*	2.88*	3.29*	4.15*	4.60*	5.57*	9.18*	15.08*
	14	1.47	1.82	2.56	2.96*	3.46*	3.97*	5.08*	5.69*	7.01*	12.77*	29.12*
950	8	1.16	1.42	1.98	2.28*	2.63*	3.00*	3.76*	4.16*	4.99*	7.91*	11.95*
	10	1.28	1.58	2.21	2.55*	2.95*	3.37*	4.25*	4.72*	5.72*	9.40*	15.36*
	14	1.51	1.87	2.63	3.04*	3.55*	4.08*	5.21*	5.83*	7.19*	13.04*	29.18*
1000	8	1.18	1.46	2.03	2.33*	2.70*	3.07*	3.85*	4.25*	5.11*	8.09*	12.20*
	10	1.31	1.62	2.27	2.61*	3.02*	3.45*	4.36*	4.84*	5.85*	9.61*	15.63*
	14	1.55	1.92	2.70	3.12*	3.64*	4.18*	5.34*	5.98*	7.36*	13.30*	29.26*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 m (RADIUS = 1.4 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE
 TIME INDEX
 OF RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C/min	1	2	4	5	6	7	9	10	12	18	24
50	8	0.69	0.86	1.22	1.43*	1.67*	1.93*	2.61*	3.10*	4.90*	23.48*	83.67*
	10	0.74	0.92	1.33	1.57*	1.87*	2.22*	3.32*	4.38*	8.30*	44.22*	161.40*
	14	0.82	1.04	1.56	1.90*	2.38*	3.12*	6.71*	9.93*	20.52*	118.35*	439.17*
100	8	0.84	1.05	1.50	1.75*	2.05*	2.37*	3.16*	3.67*	5.21*	23.48*	83.67*
	10	0.91	1.14	1.66	1.95*	2.31*	2.73*	3.86*	4.76*	8.31*	44.22*	161.40*
	14	1.04	1.32	1.97	2.37*	2.92*	3.66*	6.75*	9.93*	20.52*	118.35*	439.17*
150	8	0.97	1.21	1.72	2.01*	2.35*	2.73*	3.61*	4.16*	5.68*	23.48*	83.67*
	10	1.06	1.32	1.91	2.25*	2.67*	3.14*	4.36*	5.24*	8.41*	44.22*	161.40*
	14	1.22	1.54	2.29	2.75*	3.37*	4.15*	6.97*	9.95*	20.52*	118.35*	439.17*
200	8	1.08	1.34	1.92	2.23*	2.62*	3.03*	4.00*	4.59*	6.15*	23.48*	83.67*
	10	1.18	1.48	2.14	2.51*	2.97*	3.50*	4.81*	5.70*	8.66*	44.22*	161.40*
	14	1.38	1.73	2.57	3.08*	3.75*	4.58*	7.32*	10.05*	20.52*	118.35*	439.17*
250	8	1.18	1.46	2.09	2.43*	2.85*	3.31*	4.35*	4.98*	6.59*	23.48*	83.67*
	10	1.30	1.62	2.34	2.74*	3.25*	3.82*	5.21*	6.13*	8.99*	44.22*	161.40*
	14	1.52	1.91	2.82	3.38*	4.10*	4.98*	7.71*	10.25*	20.52*	118.35*	439.17*
300	8	1.27	1.58	2.25	2.62*	3.07*	3.56*	4.68*	5.34*	7.00*	23.48*	83.67*
	10	1.40	1.75	2.52	2.96*	3.50*	4.11*	5.58*	6.54*	9.36*	44.22*	161.40*
	14	1.64	2.07	3.06	3.65*	4.42*	5.35*	8.10*	10.53*	20.52*	118.35*	439.17*
350	8	1.35	1.68	2.40	2.79*	3.27*	3.79*	4.98*	5.67*	7.39*	23.49*	83.67*
	10	1.50	1.87	2.69	3.16*	3.74*	4.38*	5.93*	6.92*	9.74*	44.22*	161.40*
	14	1.76	2.22	3.27	3.90*	4.72*	5.69*	8.49*	10.84*	20.53*	118.35*	439.17*
400	8	1.43	1.78	2.54	2.95*	3.46*	4.01*	5.26*	5.99*	7.77*	23.50*	83.67*
	10	1.59	1.98	2.86	3.35*	3.96*	4.64*	6.26*	7.28*	10.12*	44.22*	161.40*
	14	1.88	2.36	3.47	4.14*	5.00*	6.02*	8.87*	11.17*	20.56*	118.35*	439.17*
450	8	1.51	1.87	2.67	3.11*	3.65*	4.22*	5.53*	6.29*	8.12*	23.52*	83.67*
	10	1.68	2.09	3.01	3.53*	4.17*	4.88*	6.58*	7.62*	10.49*	44.22*	161.40*
	14	1.99	2.49	3.67	4.36*	5.27*	6.32*	9.24*	11.52*	20.60*	118.35*	439.17*
500	8	1.58	1.96	2.80	3.25*	3.82*	4.42*	5.79*	6.57*	8.47*	23.57*	83.67*
	10	1.76	2.20	3.16	3.70*	4.38*	5.12*	6.87*	7.95*	10.86*	44.22*	161.40*
	14	2.09	2.62	3.85	4.58*	5.52*	6.62*	9.60*	11.86*	20.67*	118.35*	439.17*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 m (RADIUS = 1.4 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		(m*s) ^{1/2}										
		1	2	4	5	6	7	9	10	12	18	24
550	8	1.65	2.05	2.92	3.40*	3.99*	4.61*	6.03*	6.85*	8.79*	23.64*	83.67*
	10	1.84	2.29	3.30	3.86*	4.57*	5.34*	7.16*	8.27*	11.22*	44.22*	161.40*
	14	2.19	2.75	4.03	4.79*	5.77*	6.90*	9.94*	12.20*	20.77*	118.35*	439.17*
600	8	1.72	2.13	3.04	3.53*	4.14*	4.80*	6.27*	7.11*	9.11*	23.73*	83.67*
	10	1.92	2.39	3.43	4.02*	4.75*	5.56*	7.44*	8.58*	11.56*	44.22*	161.40*
	14	2.28	2.86	4.20	4.98*	6.00*	7.17*	10.28*	12.54*	20.90*	118.35*	439.17*
650	8	1.78	2.21	3.15	3.66*	4.30*	4.98*	6.50*	7.36*	9.42*	23.85*	83.67*
	10	1.99	2.48	3.56	4.17*	4.93*	5.76*	7.70*	8.87*	11.90*	44.22*	161.40*
	14	2.38	2.98	4.36	5.17*	6.23*	7.43*	10.60*	12.88*	21.06*	118.35*	439.17*
700	8	1.85	2.29	3.26	3.79*	4.45*	5.15*	6.72*	7.61*	9.71*	24.00*	83.67*
	10	2.07	2.57	3.69	4.32*	5.11*	5.96*	7.96*	9.16*	12.24*	44.22*	161.40*
	14	2.46	3.09	4.52	5.36*	6.45*	7.69*	10.92*	13.21*	21.24*	118.35*	439.17*
750	8	1.91	2.37	3.37	3.91*	4.59*	5.32*	6.93*	7.85*	10.00*	24.16*	83.67*
	10	2.14	2.66	3.82	4.46*	5.28*	6.16*	8.21*	9.44*	12.56*	44.23*	161.40*
	14	2.55	3.20	4.67	5.54*	6.66*	7.93*	11.23*	13.53*	21.44*	118.35*	439.17*
800	8	1.97	2.44	3.47	4.03*	4.73*	5.48*	7.14*	8.08*	10.28*	24.35*	83.67*
	10	2.21	2.74	3.94	4.60*	5.44*	6.35*	8.45*	9.71*	12.88*	44.23*	161.40*
	14	2.64	3.30	4.82	5.72*	6.86*	8.17*	11.53*	13.85*	21.66*	118.35*	439.17*
850	8	2.03	2.51	3.57	4.15*	4.87*	5.64*	7.34*	8.31*	10.55*	24.56*	83.67*
	10	2.27	2.83	4.05	4.74*	5.60*	6.53*	8.69*	9.97*	13.19*	44.23*	161.40*
	14	2.72	3.41	4.97	5.89*	7.07*	8.40*	11.82*	14.17*	21.89*	118.35*	439.17*
900	8	2.08	2.58	3.67	4.27*	5.01*	5.79*	7.54*	8.53*	10.82*	24.78*	83.67*
	10	2.34	2.91	4.17	4.87*	5.76*	6.71*	8.92*	10.23*	13.49*	44.24*	161.40*
	14	2.80	3.51	5.11	6.05*	7.26*	8.63*	12.11*	14.47*	22.13*	118.35*	439.17*
950	8	2.14	2.65	3.77	4.38*	5.14*	5.94*	7.74*	8.74*	11.08*	25.01*	83.67*
	10	2.40	2.99	4.28	5.00*	5.91*	6.89*	9.15*	10.48*	13.79*	44.25*	161.40*
	14	2.88	3.60	5.25	6.21*	7.45*	8.85*	12.39*	14.78*	22.38*	118.35*	439.17*
1000	8	2.19	2.72	3.86	4.49*	5.27*	6.09*	7.92*	8.96*	11.34*	25.25*	83.67*
	10	2.46	3.06	4.39	5.13*	6.06*	7.06*	9.37*	10.73*	14.08*	44.26*	161.40*
	14	2.95	3.70	5.39	6.37*	7.64*	9.07*	12.67*	15.07*	22.64*	118.35*	439.17*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 m (RADIUS = 1.4 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	1.15	1.47	2.34	3.05*	4.45*	7.23*	18.26*	27.76*	59.12*	350.46*	1307.6*
	10	1.26	1.64	2.83	4.27*	7.51*	12.99*	34.33*	52.78*	113.84*	682.33*	2551.1*
	14	1.47	1.99	4.83	9.80*	18.73*	33.56*	91.75*	142.21*	309.42*	1868.3*	6995.5*
100	8	1.47	1.88	2.93	3.70*	4.96*	7.32*	18.26*	27.76*	59.12*	350.46*	1307.6*
	10	1.63	2.11	3.49	4.78*	7.57*	12.99*	34.33*	52.78*	113.84*	682.33*	2551.1*
	14	1.93	2.58	5.24	9.81*	18.73*	33.56*	91.75*	142.21*	309.42*	1868.3*	6995.5*
150	8	1.73	2.20	3.40	4.25*	5.53*	7.64*	18.26*	27.76*	59.12*	350.46*	1307.6*
	10	1.92	2.49	4.04	5.34*	7.84*	12.99*	34.33*	52.78*	113.84*	682.33*	2551.1*
	14	2.30	3.06	5.80	9.87*	18.73*	33.56*	91.75*	142.21*	309.42*	1868.3*	6995.5*
200	8	1.95	2.48	3.82	4.73*	6.06*	8.09*	18.26*	27.76*	59.12*	350.46*	1307.6*
	10	2.18	2.81	4.52	5.87*	8.25*	13.04*	34.33*	52.78*	113.84*	682.33*	2551.1*
	14	2.62	3.47	6.35	10.06*	18.73*	33.56*	91.75*	142.21*	309.42*	1868.3*	6995.5*
250	8	2.15	2.74	4.19	5.16*	6.55*	8.57*	18.27*	27.76*	59.12*	350.46*	1307.6*
	10	2.41	3.11	4.95	6.36*	8.71*	13.18*	34.33*	52.78*	113.84*	682.33*	2551.1*
	14	2.91	3.84	6.86	10.37*	18.74*	33.56*	91.75*	142.21*	309.42*	1868.3*	6995.5*
300	8	2.34	2.97	4.53	5.56*	7.01*	9.04*	18.32*	27.76*	59.12*	350.46*	1307.6*
	10	2.63	3.38	5.35	6.81*	9.17*	13.40*	34.33*	52.78*	113.84*	682.33*	2551.1*
	14	3.18	4.18	7.34	10.75*	18.77*	33.56*	91.75*	142.21*	309.42*	1868.3*	6995.5*
350	8	2.51	3.19	4.85	5.93*	7.44*	9.50*	18.41*	27.76*	59.12*	350.46*	1307.6*
	10	2.83	3.63	5.72	7.24*	9.62*	13.69*	34.33*	52.78*	113.84*	682.33*	2551.1*
	14	3.42	4.50	7.80	11.14*	18.82*	33.56*	91.75*	142.21*	309.42*	1868.3*	6995.5*
400	8	2.67	3.39	5.14	6.28*	7.85*	9.94*	18.55*	27.76*	59.12*	350.46*	1307.6*
	10	3.02	3.87	6.07	7.64*	10.06*	14.03*	34.33*	52.78*	113.84*	682.33*	2551.1*
	14	3.66	4.79	8.23	11.55*	18.93*	33.56*	91.75*	142.21*	309.42*	1868.3*	6995.5*
450	8	2.83	3.59	5.43	6.61*	8.23*	10.37*	18.75*	27.78*	59.12*	350.46*	1307.6*
	10	3.20	4.09	6.40	8.02*	10.48*	14.39*	34.33*	52.78*	113.84*	682.33*	2551.1*
	14	3.88	5.08	8.64	11.96*	19.07*	33.56*	91.75*	142.21*	309.42*	1868.3*	6995.5*
500	8	2.98	3.77	5.70	6.92*	8.61*	10.78*	18.99*	27.81*	59.12*	350.46*	1307.6*
	10	3.37	4.31	6.71	8.39*	10.90*	14.76*	34.33*	52.78*	113.84*	682.33*	2551.1*
	14	4.09	5.35	9.03	12.37*	19.27*	33.57*	91.75*	142.21*	309.42*	1868.3*	6995.5*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 m (RADIUS = 1.4 m)
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C/min												
	8	3.12	3.95	5.96	7.23*	8.96*	11.18*	19.26*	27.86*	59.12*	350.46*	1307.6*	
	10	3.53	4.51	7.02	8.74*	11.30*	15.14*	34.34*	52.78*	113.84*	682.33*	2551.1*	
	14	4.30	5.61	9.41	12.77*	19.50*	33.57*	91.75*	142.21*	309.42*	1868.3*	6995.5*	
600	8	3.26	4.12	6.20	7.52*	9.30*	11.57*	19.56*	27.94*	59.12*	350.46*	1307.6*	
	10	3.69	4.71	7.31	9.08*	11.68*	15.52*	34.35*	52.78*	113.84*	682.33*	2551.1*	
	14	4.49	5.86	9.77	13.16*	19.75*	33.59*	91.75*	142.21*	309.42*	1868.3*	6995.5*	
650	8	3.39	4.29	6.45	7.80*	9.64*	11.95*	19.87*	28.04*	59.12*	350.46*	1307.6*	
	10	3.84	4.91	7.59	9.41*	12.06*	15.90*	34.38*	52.78*	113.84*	682.33*	2551.1*	
	14	4.68	6.10	10.12	13.54*	20.04*	33.61*	91.75*	142.21*	309.42*	1868.3*	6995.5*	
700	8	3.52	4.45	6.68	8.07*	9.96*	12.31*	20.20*	28.17*	59.12*	350.46*	1307.6*	
	10	3.99	5.09	7.86	9.73*	12.43*	16.28*	34.41*	52.78*	113.84*	682.33*	2551.1*	
	14	4.87	6.33	10.46	13.92*	20.33*	33.65*	91.75*	142.21*	309.42*	1868.3*	6995.5*	
750	8	3.64	4.61	6.90	8.34*	10.27*	12.67*	20.54*	28.33*	59.12*	350.46*	1307.6*	
	10	4.13	5.27	8.12	10.03*	12.78*	16.65*	34.46*	52.78*	113.84*	682.33*	2551.1*	
	14	5.04	6.56	10.80	14.29*	20.64*	33.69*	91.75*	142.21*	309.42*	1868.3*	6995.5*	
800	8	3.77	4.76	7.12	8.59*	10.57*	13.01*	20.88*	28.50*	59.12*	350.46*	1307.6*	
	10	4.27	5.45	8.38	10.33*	13.13*	17.02*	34.53*	52.78*	113.84*	682.33*	2551.1*	
	14	5.22	6.78	11.12	14.65*	20.96*	33.76*	91.75*	142.21*	309.42*	1868.3*	6995.5*	
850	8	3.88	4.91	7.34	8.84*	10.87*	13.35*	21.23*	28.70*	59.12*	350.46*	1307.6*	
	10	4.41	5.62	8.63	10.63*	13.47*	17.39*	34.61*	52.78*	113.84*	682.33*	2551.1*	
	14	5.39	6.99	11.43	15.00*	21.28*	33.84*	91.75*	142.21*	309.42*	1868.3*	6995.5*	
900	8	4.00	5.05	7.55	9.09*	11.16*	13.68*	21.57*	28.92*	59.12*	350.46*	1307.6*	
	10	4.54	5.79	8.87	10.91*	13.80*	17.74*	34.71*	52.79*	113.84*	682.33*	2551.1*	
	14	5.55	7.20	11.74	15.35*	21.61*	33.94*	91.75*	142.21*	309.42*	1868.3*	6995.5*	
950	8	4.11	5.19	7.75	9.33*	11.44*	14.00*	21.92*	29.16*	59.12*	350.46*	1307.6*	
	10	4.67	5.95	9.11	11.19*	14.13*	18.10*	34.83*	52.79*	113.84*	682.33*	2551.1*	
	14	5.71	7.40	12.04	15.69*	21.94*	34.06*	91.75*	142.21*	309.42*	1868.3*	6995.5*	
1000	8	4.22	5.33	7.95	9.56*	11.71*	14.32*	22.26*	29.41*	59.12*	350.46*	1307.6*	
	10	4.80	6.11	9.34	11.46*	14.44*	18.45*	34.97*	52.80*	113.84*	682.33*	2551.1*	
	14	5.87	7.60	12.33	16.02*	22.27*	34.19*	91.75*	142.21*	309.42*	1868.3*	6995.5*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.5 m (RADIUS = 1.8 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
		(m*s) ^{1/2}										
50	8	0.34	0.41	0.54	0.61	0.68*	0.75*	0.89*	0.97*	1.11*	1.57*	2.10*
	10	0.36	0.42	0.56	0.63	0.71*	0.78*	0.94*	1.02*	1.18*	1.70*	2.35*
	14	0.38	0.45	0.60	0.68	0.76*	0.85*	1.02*	1.11*	1.30*	1.98*	3.20*
100	8	0.39	0.46	0.62	0.69	0.77*	0.85*	1.02*	1.11*	1.29*	1.84*	2.46*
	10	0.41	0.49	0.65	0.73	0.81*	0.90*	1.09*	1.18*	1.38*	2.00*	2.76*
	14	0.44	0.53	0.71	0.80	0.89*	1.00*	1.21*	1.32*	1.55*	2.36*	3.60*
150	8	0.43	0.51	0.68	0.76	0.84*	0.94*	1.13*	1.23*	1.42*	2.05*	2.75*
	10	0.45	0.54	0.72	0.81	0.90*	1.00*	1.21*	1.32*	1.54*	2.25*	3.10*
	14	0.50	0.59	0.79	0.90	1.00*	1.12*	1.36*	1.49*	1.75*	2.67*	3.98*
200	8	0.46	0.54	0.73	0.82	0.91*	1.01*	1.22*	1.33*	1.54*	2.23*	3.00*
	10	0.49	0.58	0.78	0.88	0.97*	1.09*	1.32*	1.43*	1.68*	2.46*	3.39*
	14	0.54	0.65	0.87	0.98	1.09*	1.22*	1.49*	1.64*	1.93*	2.94*	4.34*
250	8	0.49	0.58	0.77	0.87	0.97*	1.08*	1.30*	1.42*	1.65*	2.39*	3.22*
	10	0.52	0.62	0.83	0.94	1.04*	1.16*	1.41*	1.54*	1.80*	2.65*	3.65*
	14	0.59	0.70	0.93	1.05	1.17*	1.32*	1.61*	1.77*	2.08*	3.18*	4.66*
300	8	0.52	0.61	0.82	0.92	1.02*	1.14*	1.38*	1.50*	1.75*	2.54*	3.43*
	10	0.56	0.66	0.88	0.99	1.10*	1.23*	1.50*	1.64*	1.92*	2.82*	3.89*
	14	0.62	0.74	0.99	1.12	1.25*	1.40*	1.72*	1.89*	2.23*	3.40*	4.96*
350	8	0.54	0.64	0.86	0.97	1.07*	1.20*	1.45*	1.58*	1.84*	2.68*	3.62*
	10	0.58	0.69	0.93	1.04	1.16*	1.30*	1.58*	1.73*	2.02*	2.99*	4.12*
	14	0.66	0.78	1.05	1.19	1.32*	1.49*	1.82*	2.00*	2.36*	3.60*	5.24*
400	8	0.57	0.67	0.90	1.01	1.12*	1.25*	1.52*	1.66*	1.93*	2.81*	3.80*
	10	0.61	0.73	0.97	1.09	1.21*	1.36*	1.66*	1.81*	2.12*	3.14*	4.33*
	14	0.69	0.82	1.11	1.25	1.39*	1.56*	1.92*	2.11*	2.49*	3.80*	5.50*
450	8	0.59	0.70	0.93	1.05	1.16*	1.30*	1.58*	1.73*	2.02*	2.94*	3.97*
	10	0.64	0.76	1.01	1.14	1.27*	1.42*	1.73*	1.89*	2.22*	3.28*	4.53*
	14	0.73	0.86	1.16	1.31	1.45*	1.64*	2.01*	2.21*	2.61*	3.98*	5.75*
500	8	0.61	0.72	0.97	1.09	1.21*	1.35*	1.64*	1.79*	2.10*	3.06*	4.13*
	10	0.66	0.79	1.05	1.18	1.32*	1.48*	1.80*	1.97*	2.31*	3.42*	4.72*
	14	0.76	0.90	1.21	1.36	1.52*	1.71*	2.10*	2.30*	2.72*	4.16*	5.99*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.5 m (RADIUS = 1.8 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	0.63	0.75	1.00	1.13	1.25*	1.40*	1.70*	1.86*	2.17*	3.17*	4.29*	
	10	0.69	0.82	1.09	1.23	1.36*	1.53*	1.87*	2.04*	2.40*	3.56*	4.90*	
	14	0.79	0.93	1.25	1.41	1.57*	1.77*	2.18*	2.39*	2.83*	4.32*	6.22*	
600	8	0.65	0.77	1.03	1.16	1.29*	1.44*	1.76*	1.92*	2.25*	3.28*	4.44*	
	10	0.71	0.84	1.13	1.27	1.41*	1.58*	1.94*	2.12*	2.49*	3.69*	5.08*	
	14	0.82	0.97	1.30	1.46	1.63*	1.84*	2.26*	2.48*	2.94*	4.48*	6.44*	
650	8	0.67	0.80	1.06	1.20	1.33*	1.49*	1.81*	1.98*	2.32*	3.39*	4.59*	
	10	0.73	0.87	1.16	1.31	1.45*	1.63*	2.00*	2.18*	2.57*	3.81*	5.25*	
	14	0.84	1.00	1.34	1.51	1.69*	1.90*	2.34*	2.57*	3.04*	4.64*	6.66*	
700	8	0.69	0.82	1.09	1.23	1.37*	1.53*	1.87*	2.04*	2.39*	3.49*	4.73*	
	10	0.76	0.90	1.20	1.35	1.50*	1.68*	2.06*	2.25*	2.65*	3.93*	5.41*	
	14	0.87	1.03	1.38	1.56	1.74*	1.96*	2.42*	2.65*	3.14*	4.79*	6.87*	
750	8	0.71	0.84	1.12	1.26	1.40*	1.57*	1.92*	2.09*	2.45*	3.59*	4.87*	
	10	0.78	0.92	1.23	1.39	1.54*	1.73*	2.12*	2.32*	2.72*	4.05*	5.57*	
	14	0.90	1.06	1.42	1.61	1.79*	2.02*	2.49*	2.73*	3.24*	4.94*	7.07*	
800	8	0.73	0.86	1.15	1.30	1.44*	1.61*	1.97*	2.15*	2.52*	3.69*	5.00*	
	10	0.80	0.95	1.26	1.42	1.58*	1.78*	2.18*	2.38*	2.80*	4.16*	5.72*	
	14	0.92	1.09	1.47	1.65	1.84*	2.08*	2.56*	2.81*	3.33*	5.08*	7.26*	
850	8	0.75	0.88	1.18	1.33	1.47*	1.65*	2.02*	2.20*	2.58*	3.79*	5.13*	
	10	0.82	0.97	1.29	1.46	1.62*	1.82*	2.23*	2.44*	2.87*	4.27*	5.88*	
	14	0.95	1.12	1.50	1.70	1.89*	2.13*	2.63*	2.89*	3.42*	5.22*	7.45*	
900	8	0.76	0.90	1.21	1.36	1.51*	1.69*	2.06*	2.25*	2.64*	3.88*	5.25*	
	10	0.84	0.99	1.33	1.49	1.66*	1.87*	2.29*	2.50*	2.94*	4.38*	6.02*	
	14	0.97	1.15	1.54	1.74	1.94*	2.19*	2.70*	2.96*	3.51*	5.35*	7.64*	
950	8	0.78	0.92	1.23	1.39	1.54*	1.73*	2.11*	2.31*	2.70*	3.97*	5.38*	
	10	0.86	1.02	1.36	1.53	1.70*	1.91*	2.34*	2.56*	3.01*	4.48*	6.17*	
	14	0.99	1.18	1.58	1.78	1.99*	2.24*	2.76*	3.03*	3.60*	5.48*	7.82*	
1000	8	0.80	0.94	1.26	1.42	1.57*	1.76*	2.16*	2.36*	2.76*	4.06*	5.50*	
	10	0.88	1.04	1.39	1.56	1.73*	1.95*	2.39*	2.62*	3.08*	4.58*	6.31*	
	14	1.02	1.21	1.62	1.82	2.03*	2.29*	2.83*	3.11*	3.68*	5.61*	8.00*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.5 m (RADIUS = 1.8 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	0.52	0.61	0.83	0.93	1.04*	1.17*	1.42*	1.56*	1.85*	3.12*	7.20*
	10	0.54	0.65	0.88	0.99	1.11*	1.25*	1.54*	1.70*	2.07*	4.33*	12.51*
	14	0.59	0.71	0.97	1.11	1.25*	1.42*	1.82*	2.05*	2.69*	9.50*	31.47*
100	8	0.61	0.73	0.98	1.11	1.23*	1.38*	1.70*	1.86*	2.22*	3.63*	7.23*
	10	0.65	0.78	1.05	1.19	1.33*	1.50*	1.87*	2.06*	2.49*	4.64*	12.51*
	14	0.73	0.87	1.19	1.36	1.53*	1.74*	2.22*	2.50*	3.18*	9.50*	31.47*
150	8	0.69	0.82	1.10	1.24	1.39*	1.56*	1.92*	2.11*	2.51*	4.06*	7.39*
	10	0.74	0.88	1.19	1.35	1.51*	1.71*	2.12*	2.35*	2.84*	5.06*	12.51*
	14	0.83	1.00	1.36	1.55	1.75*	2.00*	2.55*	2.86*	3.60*	9.51*	31.47*
200	8	0.75	0.89	1.20	1.36	1.52*	1.71*	2.11*	2.32*	2.77*	4.45*	7.68*
	10	0.81	0.97	1.31	1.49	1.67*	1.89*	2.35*	2.60*	3.14*	5.47*	12.52*
	14	0.93	1.11	1.51	1.73	1.95*	2.22*	2.83*	3.17*	3.98*	9.58*	31.47*
250	8	0.81	0.97	1.30	1.47	1.64*	1.85*	2.29*	2.51*	3.00*	4.80*	8.03*
	10	0.88	1.05	1.42	1.61	1.81*	2.05*	2.55*	2.82*	3.40*	5.86*	12.57*
	14	1.01	1.21	1.65	1.88	2.12*	2.42*	3.08*	3.45*	4.31*	9.74*	31.47*
300	8	0.87	1.03	1.39	1.57	1.75*	1.98*	2.44*	2.69*	3.21*	5.12*	8.38*
	10	0.95	1.13	1.52	1.73	1.94*	2.19*	2.73*	3.02*	3.65*	6.22*	12.66*
	14	1.09	1.30	1.78	2.03	2.28*	2.61*	3.32*	3.71*	4.62*	9.96*	31.47*
350	8	0.92	1.09	1.47	1.66	1.86*	2.10*	2.59*	2.85*	3.40*	5.43*	8.74*
	10	1.01	1.20	1.62	1.84	2.06*	2.33*	2.91*	3.21*	3.88*	6.57*	12.82*
	14	1.16	1.39	1.89	2.16	2.43*	2.78*	3.53*	3.95*	4.91*	10.23*	31.47*
400	8	0.97	1.15	1.55	1.75	1.96*	2.21*	2.73*	3.01*	3.59*	5.71*	9.09*
	10	1.06	1.26	1.71	1.94	2.17*	2.46*	3.07*	3.39*	4.10*	6.89*	13.02*
	14	1.23	1.47	2.00	2.28	2.57*	2.94*	3.74*	4.18*	5.18*	10.52*	31.47*
450	8	1.01	1.21	1.62	1.84	2.05*	2.31*	2.86*	3.15*	3.76*	5.98*	9.43*
	10	1.11	1.33	1.79	2.03	2.28*	2.58*	3.22*	3.56*	4.30*	7.20*	13.25*
	14	1.30	1.55	2.11	2.40	2.71*	3.09*	3.93*	4.39*	5.44*	10.81*	31.47*
500	8	1.06	1.26	1.69	1.91	2.14*	2.41*	2.99*	3.29*	3.93*	6.24*	9.76*
	10	1.17	1.39	1.87	2.12	2.38*	2.70*	3.37*	3.73*	4.49*	7.50*	13.51*
	14	1.36	1.62	2.21	2.52	2.83*	3.24*	4.11*	4.60*	5.68*	11.12*	31.47*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.5 m (RADIUS = 1.8 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	1.10	1.31	1.76	1.99	2.22*	2.51*	3.11*	3.43*	4.09*	6.48*	10.08*
	10	1.21	1.45	1.95	2.21	2.48*	2.81*	3.51*	3.88*	4.68*	7.78*	13.78*
	14	1.42	1.69	2.30	2.63	2.96*	3.38*	4.29*	4.79*	5.92*	11.42*	31.47*
600	8	1.14	1.36	1.83	2.06	2.31*	2.60*	3.23*	3.56*	4.25*	6.72*	10.39*
	10	1.26	1.50	2.03	2.30	2.57*	2.92*	3.64*	4.03*	4.86*	8.06*	14.06*
	14	1.48	1.76	2.40	2.73	3.07*	3.51*	4.46*	4.98*	6.15*	11.72*	31.48*
650	8	1.18	1.40	1.89	2.14	2.38*	2.69*	3.34*	3.68*	4.40*	6.95*	10.69*
	10	1.31	1.56	2.10	2.38	2.66*	3.02*	3.78*	4.18*	5.04*	8.32*	14.34*
	14	1.53	1.83	2.49	2.83	3.19*	3.64*	4.63*	5.16*	6.37*	12.02*	31.48*
700	8	1.22	1.45	1.95	2.20	2.46*	2.78*	3.45*	3.80*	4.54*	7.17*	10.99*
	10	1.35	1.61	2.17	2.46	2.75*	3.12*	3.90*	4.32*	5.20*	8.58*	14.63*
	14	1.59	1.89	2.57	2.93	3.30*	3.77*	4.78*	5.34*	6.58*	12.31*	31.49*
750	8	1.26	1.49	2.01	2.27	2.54*	2.87*	3.56*	3.92*	4.68*	7.39*	11.27*
	10	1.39	1.66	2.24	2.54	2.84*	3.22*	4.03*	4.45*	5.37*	8.83*	14.92*
	14	1.64	1.96	2.66	3.03	3.41*	3.89*	4.94*	5.51*	6.79*	12.60*	31.50*
800	8	1.29	1.54	2.07	2.34	2.61*	2.95*	3.66*	4.03*	4.82*	7.59*	11.56*
	10	1.43	1.71	2.30	2.61	2.92*	3.31*	4.15*	4.59*	5.53*	9.07*	15.20*
	14	1.69	2.02	2.74	3.12	3.51*	4.01*	5.09*	5.68*	6.99*	12.89*	31.52*
850	8	1.33	1.58	2.12	2.40	2.68*	3.03*	3.76*	4.14*	4.95*	7.80*	11.83*
	10	1.48	1.76	2.37	2.68	3.00*	3.41*	4.26*	4.71*	5.68*	9.31*	15.48*
	14	1.74	2.08	2.82	3.21	3.61*	4.13*	5.24*	5.84*	7.18*	13.17*	31.54*
900	8	1.36	1.62	2.18	2.46	2.75*	3.11*	3.86*	4.25*	5.08*	8.00*	12.10*
	10	1.52	1.80	2.43	2.76	3.08*	3.50*	4.38*	4.84*	5.83*	9.54*	15.77*
	14	1.79	2.13	2.90	3.30	3.71*	4.24*	5.38*	6.00*	7.37*	13.44*	31.58*
950	8	1.40	1.66	2.23	2.52	2.82*	3.19*	3.96*	4.36*	5.21*	8.19*	12.36*
	10	1.55	1.85	2.49	2.83	3.16*	3.59*	4.49*	4.96*	5.98*	9.77*	16.04*
	14	1.84	2.19	2.98	3.39	3.81*	4.35*	5.52*	6.15*	7.56*	13.71*	31.62*
1000	8	1.43	1.70	2.28	2.58	2.88*	3.26*	4.05*	4.46*	5.33*	8.38*	12.62*
	10	1.59	1.89	2.55	2.89	3.24*	3.67*	4.60*	5.08*	6.12*	9.99*	16.32*
	14	1.88	2.25	3.05	3.47	3.90*	4.46*	5.65*	6.30*	7.74*	13.98*	31.67*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.5 m (RADIUS = 1.8 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	0.82	0.98	1.36	1.56	1.79*	2.07*	2.82*	3.39*	5.54*	26.14*	91.24*	
	10	0.88	1.06	1.49	1.74	2.02*	2.41*	3.73*	5.04*	9.55*	49.39*	176.14*	
	14	0.99	1.21	1.76	2.14	2.67*	3.62*	8.01*	11.77*	23.91*	132.47*	479.57*	
100	8	1.01	1.21	1.67	1.93	2.20*	2.54*	3.39*	3.95*	5.75*	26.14*	91.24*	
	10	1.10	1.32	1.86	2.16	2.50*	2.95*	4.23*	5.31*	9.56*	49.39*	176.14*	
	14	1.26	1.54	2.23	2.67	3.23*	4.10*	8.02*	11.77*	23.91*	132.47*	479.57*	
150	8	1.16	1.40	1.93	2.22	2.53*	2.92*	3.86*	4.45*	6.18*	26.14*	91.24*	
	10	1.27	1.54	2.15	2.50	2.89*	3.39*	4.74*	5.75*	9.60*	49.39*	176.14*	
	14	1.48	1.80	2.60	3.10	3.71*	4.60*	8.13*	11.77*	23.91*	132.47*	479.57*	
200	8	1.30	1.56	2.15	2.47	2.81*	3.25*	4.27*	4.90*	6.63*	26.14*	91.24*	
	10	1.43	1.72	2.41	2.79	3.22*	3.77*	5.20*	6.21*	9.75*	49.39*	176.14*	
	14	1.67	2.03	2.93	3.47	4.12*	5.05*	8.37*	11.81*	23.91*	132.47*	479.57*	
250	8	1.42	1.70	2.35	2.70	3.07*	3.54*	4.64*	5.31*	7.07*	26.14*	91.24*	
	10	1.57	1.89	2.64	3.06	3.52*	4.11*	5.62*	6.65*	10.01*	49.39*	176.14*	
	14	1.84	2.24	3.22	3.80	4.50*	5.47*	8.70*	11.91*	23.91*	132.47*	479.57*	
300	8	1.53	1.84	2.53	2.91	3.30*	3.81*	4.99*	5.69*	7.50*	26.14*	91.24*	
	10	1.70	2.04	2.85	3.30	3.79*	4.43*	6.01*	7.06*	10.33*	49.39*	176.14*	
	14	2.00	2.43	3.48	4.11	4.84*	5.86*	9.07*	12.09*	23.91*	132.47*	479.57*	
350	8	1.63	1.96	2.70	3.10	3.52*	4.06*	5.30*	6.04*	7.90*	26.14*	91.24*	
	10	1.82	2.19	3.05	3.53	4.04*	4.72*	6.38*	7.46*	10.68*	49.39*	176.14*	
	14	2.15	2.61	3.73	4.39	5.16*	6.22*	9.45*	12.33*	23.91*	132.47*	479.57*	
400	8	1.73	2.08	2.86	3.28	3.73*	4.30*	5.60*	6.37*	8.29*	26.15*	91.24*	
	10	1.93	2.32	3.23	3.74	4.28*	5.00*	6.73*	7.83*	11.05*	49.39*	176.14*	
	14	2.29	2.78	3.96	4.66	5.46*	6.57*	9.82*	12.61*	23.92*	132.47*	479.57*	
450	8	1.83	2.19	3.01	3.46	3.92*	4.52*	5.89*	6.69*	8.65*	26.16*	91.24*	
	10	2.04	2.45	3.41	3.94	4.51*	5.26*	7.06*	8.19*	11.41*	49.39*	176.14*	
	14	2.42	2.94	4.18	4.92	5.75*	6.90*	10.19*	12.91*	23.93*	132.47*	479.57*	
500	8	1.92	2.30	3.16	3.62	4.11*	4.74*	6.16*	6.99*	9.01*	26.18*	91.24*	
	10	2.14	2.58	3.58	4.13	4.73*	5.51*	7.37*	8.54*	11.77*	49.39*	176.14*	
	14	2.55	3.09	4.40	5.16	6.03*	7.21*	10.55*	13.23*	23.96*	132.47*	479.57*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.5 m (RADIUS = 1.8 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	(m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
			1	2	4	5	6	7	9	10	12	18	24
550	8 10 14	8	2.00	2.40	3.30	3.78	4.29*	4.94*	6.42*	7.28*	9.35*	26.21*	91.24*
		10	2.24	2.70	3.74	4.32	4.94*	5.75*	7.68*	8.87*	12.13*	49.39*	176.14*
		14	2.67	3.24	4.60	5.39	6.29*	7.51*	10.91*	13.56*	24.00*	132.47*	479.57*
600	8 10 14	8	2.08	2.50	3.43	3.94	4.46*	5.14*	6.67*	7.55*	9.68*	26.27*	91.24*
		10	2.33	2.81	3.90	4.50	5.14*	5.98*	7.97*	9.19*	12.48*	49.39*	176.14*
		14	2.79	3.38	4.79	5.62	6.54*	7.80*	11.25*	13.89*	24.07*	132.47*	479.57*
650	8 10 14	8	2.16	2.60	3.56	4.08	4.63*	5.33*	6.91*	7.82*	10.00*	26.34*	91.24*
		10	2.43	2.92	4.05	4.67	5.33*	6.20*	8.25*	9.50*	12.83*	49.39*	176.14*
		14	2.90	3.52	4.98	5.83	6.79*	8.08*	11.59*	14.21*	24.16*	132.47*	479.57*
700	8 10 14	8	2.24	2.69	3.69	4.23	4.79*	5.51*	7.15*	8.08*	10.31*	26.44*	91.24*
		10	2.51	3.03	4.19	4.83	5.52*	6.41*	8.52*	9.80*	13.17*	49.39*	176.14*
		14	3.01	3.65	5.16	6.04	7.02*	8.35*	11.92*	14.54*	24.27*	132.47*	479.57*
750	8 10 14	8	2.32	2.78	3.81	4.37	4.94*	5.69*	7.37*	8.33*	10.61*	26.56*	91.24*
		10	2.60	3.13	4.33	5.00	5.70*	6.62*	8.79*	10.09*	13.50*	49.39*	176.14*
		14	3.12	3.78	5.34	6.24	7.25*	8.61*	12.24*	14.87*	24.41*	132.47*	479.57*
800	8 10 14	8	2.39	2.87	3.93	4.50	5.10*	5.87*	7.59*	8.58*	10.90*	26.70*	91.24*
		10	2.69	3.23	4.47	5.15	5.88*	6.83*	9.04*	10.38*	13.82*	49.39*	176.14*
		14	3.22	3.90	5.51	6.44	7.47*	8.87*	12.55*	15.19*	24.56*	132.47*	479.57*
850	8 10 14	8	2.46	2.95	4.05	4.63	5.24*	6.04*	7.81*	8.81*	11.18*	26.85*	91.24*
		10	2.77	3.33	4.61	5.31	6.05*	7.02*	9.29*	10.65*	14.14*	49.39*	176.14*
		14	3.32	4.03	5.68	6.63	7.69*	9.12*	12.86*	15.51*	24.73*	132.47*	479.57*
900	8 10 14	8	2.53	3.04	4.16	4.76	5.39*	6.20*	8.02*	9.05*	11.46*	27.03*	91.24*
		10	2.85	3.42	4.74	5.45	6.22*	7.22*	9.54*	10.93*	14.46*	49.39*	176.14*
		14	3.42	4.14	5.84	6.82	7.90*	9.36*	13.16*	15.82*	24.92*	132.47*	479.57*
950	8 10 14	8	2.60	3.12	4.27	4.89	5.53*	6.36*	8.22*	9.27*	11.73*	27.22*	91.24*
		10	2.93	3.52	4.86	5.60	6.38*	7.40*	9.78*	11.19*	14.76*	49.40*	176.14*
		14	3.52	4.26	6.00	7.00	8.11*	9.60*	13.45*	16.13*	25.13*	132.47*	479.57*
1000	8 10 14	8	2.67	3.20	4.38	5.01	5.67*	6.52*	8.42*	9.50*	12.00*	27.43*	91.24*
		10	3.00	3.61	4.99	5.74	6.54*	7.59*	10.01*	11.45*	15.06*	49.40*	176.14*
		14	3.61	4.37	6.16	7.18	8.31*	9.83*	13.74*	16.43*	25.34*	132.47*	479.57*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.5 m (RADIUS = 1.8 m)
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	1.38	1.72	2.69	3.58	5.47*	8.95*	22.08*	33.17*	69.17*	392.56*	1428.1*	
	10	1.52	1.93	3.38	5.42	9.58*	16.30*	41.75*	63.32*	133.44*	764.51*	2786.6*	
	14	1.80	2.40	6.53	13.04	24.31*	42.56*	112.04*	171.05*	363.12*	2093.8*	7641.5*	
100	8	1.78	2.20	3.37	4.27	5.80*	8.97*	22.08*	33.17*	69.17*	392.56*	1428.1*	
	10	1.98	2.49	4.10	5.79	9.59*	16.30*	41.75*	63.32*	133.44*	764.51*	2786.6*	
	14	2.37	3.11	6.73	13.04	24.31*	42.56*	112.04*	171.05*	363.12*	2093.8*	7641.5*	
150	8	2.10	2.59	3.91	4.87	6.32*	9.12*	22.08*	33.17*	69.17*	392.56*	1428.1*	
	10	2.35	2.95	4.73	6.34	9.68*	16.30*	41.75*	63.32*	133.44*	764.51*	2786.6*	
	14	2.83	3.68	7.22	13.05	24.31*	42.56*	112.04*	171.05*	363.12*	2093.8*	7641.5*	
200	8	2.37	2.93	4.39	5.41	6.86*	9.45*	22.08*	33.17*	69.17*	392.56*	1428.1*	
	10	2.67	3.34	5.27	6.89	9.94*	16.31*	41.75*	63.32*	133.44*	764.51*	2786.6*	
	14	3.23	4.17	7.77	13.12	24.31*	42.56*	112.04*	171.05*	363.12*	2093.8*	7641.5*	
250	8	2.62	3.23	4.82	5.89	7.36*	9.86*	22.08*	33.17*	69.17*	392.56*	1428.1*	
	10	2.95	3.69	5.77	7.42	10.30*	16.34*	41.75*	63.32*	133.44*	764.51*	2786.6*	
	14	3.59	4.62	8.31	13.27	24.31*	42.56*	112.04*	171.05*	363.12*	2093.8*	7641.5*	
300	8	2.85	3.51	5.21	6.34	7.85*	10.30*	22.09*	33.17*	69.17*	392.56*	1428.1*	
	10	3.22	4.01	6.22	7.92	10.70*	16.43*	41.75*	63.32*	133.44*	764.51*	2786.6*	
	14	3.92	5.03	8.84	13.53	24.31*	42.56*	112.04*	171.05*	363.12*	2093.8*	7641.5*	
350	8	3.06	3.77	5.57	6.76	8.30*	10.75*	22.12*	33.17*	69.17*	392.56*	1428.1*	
	10	3.47	4.32	6.65	8.39	11.13*	16.58*	41.75*	63.32*	133.44*	764.51*	2786.6*	
	14	4.23	5.41	9.34	13.85	24.32*	42.56*	112.04*	171.05*	363.12*	2093.8*	7641.5*	
400	8	3.27	4.02	5.91	7.15	8.73*	11.20*	22.17*	33.18*	69.17*	392.56*	1428.1*	
	10	3.70	4.60	7.05	8.84	11.56*	16.79*	41.75*	63.32*	133.44*	764.51*	2786.6*	
	14	4.52	5.76	9.83	14.21	24.34*	42.56*	112.04*	171.05*	363.12*	2093.8*	7641.5*	
450	8	3.46	4.25	6.24	7.52	9.15*	11.63*	22.26*	33.18*	69.17*	392.56*	1428.1*	
	10	3.92	4.87	7.43	9.27	11.99*	17.05*	41.75*	63.32*	133.44*	764.51*	2786.6*	
	14	4.79	6.10	10.29	14.60	24.38*	42.56*	112.04*	171.05*	363.12*	2093.8*	7641.5*	
500	8	3.64	4.47	6.55	7.88	9.54*	12.06*	22.39*	33.19*	69.17*	392.56*	1428.1*	
	10	4.13	5.13	7.79	9.68	12.41*	17.35*	41.75*	63.32*	133.44*	764.51*	2786.6*	
	14	5.05	6.43	10.73	14.99	24.44*	42.56*	112.04*	171.05*	363.12*	2093.8*	7641.5*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.5 m (RADIUS = 1.8 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	3.82	4.68	6.85	8.22	9.93*	12.47*	22.57*	33.20*	69.17*	392.56*	1428.1*
	10	4.33	5.37	8.13	10.07	12.82*	17.67*	41.75*	63.32*	133.44*	764.51*	2786.6*
	14	5.31	6.74	11.16	15.40	24.54*	42.56*	112.04*	171.05*	363.12*	2093.8*	7641.5*
600	8	3.99	4.89	7.13	8.55	10.29*	12.87*	22.77*	33.22*	69.17*	392.56*	1428.1*
	10	4.53	5.61	8.47	10.45	13.22*	18.01*	41.75*	63.32*	133.44*	764.51*	2786.6*
	14	5.55	7.03	11.57	15.80	24.66*	42.56*	112.04*	171.05*	363.12*	2093.8*	7641.5*
650	8	4.15	5.09	7.41	8.87	10.65*	13.27*	23.01*	33.26*	69.17*	392.56*	1428.1*
	10	4.72	5.84	8.79	10.82	13.62*	18.36*	41.76*	63.32*	133.44*	764.51*	2786.6*
	14	5.78	7.32	11.98	16.20	24.82*	42.57*	112.04*	171.05*	363.12*	2093.8*	7641.5*
700	8	4.31	5.28	7.68	9.17	10.99*	13.65*	23.27*	33.31*	69.17*	392.56*	1428.1*
	10	4.90	6.06	9.10	11.18	14.00*	18.71*	41.76*	63.32*	133.44*	764.51*	2786.6*
	14	6.01	7.60	12.36	16.60	25.00*	42.57*	112.04*	171.05*	363.12*	2093.8*	7641.5*
750	8	4.46	5.46	7.94	9.47	11.33*	14.02*	23.54*	33.39*	69.17*	392.56*	1428.1*
	10	5.08	6.28	9.41	11.53	14.38*	19.07*	41.78*	63.32*	133.44*	764.51*	2786.6*
	14	6.23	7.87	12.74	16.99	25.21*	42.58*	112.04*	171.05*	363.12*	2093.8*	7641.5*
800	8	4.61	5.65	8.19	9.76	11.66*	14.39*	23.84*	33.48*	69.17*	392.56*	1428.1*
	10	5.25	6.49	9.70	11.86	14.74*	19.43*	41.79*	63.32*	133.44*	764.51*	2786.6*
	14	6.45	8.14	13.11	17.38	25.44*	42.59*	112.04*	171.05*	363.12*	2093.8*	7641.5*
850	8	4.76	5.82	8.43	10.05	11.97*	14.75*	24.14*	33.59*	69.18*	392.56*	1428.1*
	10	5.42	6.69	9.99	12.19	15.10*	19.79*	41.82*	63.32*	133.44*	764.51*	2786.6*
	14	6.66	8.39	13.47	17.76	25.69*	42.61*	112.04*	171.05*	363.12*	2093.8*	7641.5*
900	8	4.90	5.99	8.67	10.32	12.28*	15.10*	24.46*	33.72*	69.18*	392.56*	1428.1*
	10	5.58	6.89	10.27	12.51	15.45*	20.15*	41.85*	63.32*	133.44*	764.51*	2786.6*
	14	6.86	8.64	13.82	18.14	25.95*	42.64*	112.04*	171.05*	363.12*	2093.8*	7641.5*
950	8	5.04	6.16	8.91	10.59	12.59*	15.44*	24.77*	33.87*	69.18*	392.56*	1428.1*
	10	5.74	7.09	10.54	12.82	15.80*	20.50*	41.90*	63.32*	133.44*	764.51*	2786.6*
	14	7.06	8.89	14.16	18.51	26.22*	42.67*	112.04*	171.05*	363.12*	2093.8*	7641.5*
1000	8	5.18	6.33	9.14	10.85	12.88*	15.77*	25.10*	34.04*	69.18*	392.56*	1428.1*
	10	5.90	7.28	10.81	13.13	16.14*	20.85*	41.96*	63.32*	133.44*	764.51*	2786.6*
	14	7.25	9.13	14.50	18.87	26.50*	42.71*	112.04*	171.05*	363.12*	2093.8*	7641.5*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.0 m (RADIUS = 2.1 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	0.39	0.45	0.58	0.65	0.72	0.79	0.93*	1.00*	1.15*	1.61*	2.14*	
	10	0.41	0.47	0.61	0.68	0.75	0.82	0.98*	1.05*	1.22*	1.74*	2.41*	
	14	0.44	0.50	0.66	0.73	0.81	0.89	1.07*	1.16*	1.35*	2.04*	3.36*	
100	8	0.45	0.52	0.67	0.74	0.82	0.90	1.07*	1.15*	1.33*	1.88*	2.51*	
	10	0.47	0.54	0.70	0.79	0.87	0.95	1.13*	1.23*	1.42*	2.06*	2.83*	
	14	0.51	0.59	0.77	0.87	0.96	1.05	1.26*	1.38*	1.61*	2.44*	3.74*	
150	8	0.49	0.57	0.73	0.82	0.90	0.99	1.18*	1.27*	1.47*	2.10*	2.81*	
	10	0.52	0.60	0.78	0.87	0.96	1.06	1.26*	1.37*	1.59*	2.31*	3.18*	
	14	0.58	0.67	0.87	0.97	1.08	1.18	1.42*	1.55*	1.82*	2.76*	4.12*	
200	8	0.53	0.61	0.79	0.88	0.98	1.07	1.27*	1.38*	1.60*	2.29*	3.06*	
	10	0.57	0.65	0.85	0.95	1.05	1.15	1.37*	1.49*	1.74*	2.53*	3.47*	
	14	0.63	0.73	0.95	1.06	1.18	1.29	1.56*	1.71*	2.00*	3.03*	4.48*	
250	8	0.57	0.65	0.85	0.94	1.04	1.14	1.36*	1.48*	1.71*	2.46*	3.29*	
	10	0.61	0.70	0.91	1.02	1.12	1.23	1.47*	1.60*	1.87*	2.72*	3.74*	
	14	0.68	0.79	1.03	1.15	1.27	1.40	1.69*	1.84*	2.17*	3.28*	4.81*	
300	8	0.60	0.69	0.89	1.00	1.10	1.20	1.44*	1.56*	1.81*	2.61*	3.51*	
	10	0.65	0.74	0.97	1.08	1.19	1.30	1.57*	1.70*	1.99*	2.90*	3.99*	
	14	0.73	0.84	1.09	1.22	1.36	1.49	1.80*	1.97*	2.32*	3.51*	5.11*	
350	8	0.63	0.73	0.94	1.05	1.16	1.27	1.52*	1.65*	1.91*	2.75*	3.70*	
	10	0.68	0.78	1.02	1.14	1.25	1.37	1.65*	1.80*	2.10*	3.07*	4.22*	
	14	0.77	0.89	1.16	1.30	1.44	1.58	1.91*	2.09*	2.46*	3.72*	5.40*	
400	8	0.66	0.76	0.98	1.10	1.21	1.32	1.59*	1.72*	2.00*	2.89*	3.89*	
	10	0.71	0.82	1.07	1.19	1.32	1.44	1.73*	1.89*	2.20*	3.23*	4.43*	
	14	0.81	0.94	1.22	1.36	1.51	1.66	2.01*	2.20*	2.59*	3.92*	5.67*	
450	8	0.69	0.79	1.02	1.14	1.26	1.38	1.65*	1.80*	2.09*	3.02*	4.06*	
	10	0.74	0.86	1.11	1.24	1.37	1.50	1.81*	1.97*	2.30*	3.38*	4.64*	
	14	0.85	0.98	1.28	1.43	1.58	1.74	2.11*	2.30*	2.71*	4.11*	5.93*	
500	8	0.71	0.82	1.06	1.18	1.31	1.43	1.72*	1.87*	2.17*	3.14*	4.23*	
	10	0.77	0.89	1.16	1.29	1.43	1.56	1.89*	2.05*	2.40*	3.52*	4.83*	
	14	0.89	1.02	1.33	1.49	1.65	1.81	2.20*	2.40*	2.83*	4.29*	6.17*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.0 m (RADIUS = 2.1 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	0.74	0.85	1.10	1.23	1.35	1.48	1.78*	1.93*	2.25*	3.26*	4.39*
	10	0.80	0.93	1.20	1.34	1.48	1.62	1.96*	2.13*	2.49*	3.66*	5.02*
	14	0.92	1.07	1.38	1.55	1.71	1.88	2.29*	2.50*	2.95*	4.46*	6.41*
600	8	0.76	0.88	1.14	1.27	1.40	1.53	1.84*	2.00*	2.33*	3.37*	4.55*
	10	0.83	0.96	1.24	1.39	1.53	1.68	2.03*	2.21*	2.58*	3.79*	5.20*
	14	0.96	1.10	1.44	1.61	1.78	1.95	2.37*	2.59*	3.06*	4.63*	6.63*
650	8	0.79	0.90	1.17	1.31	1.44	1.58	1.90*	2.06*	2.40*	3.48*	4.69*
	10	0.86	0.99	1.28	1.43	1.58	1.73	2.09*	2.28*	2.67*	3.92*	5.38*
	14	0.99	1.14	1.48	1.66	1.84	2.02	2.45*	2.68*	3.16*	4.79*	6.85*
700	8	0.81	0.93	1.20	1.34	1.48	1.62	1.95*	2.12*	2.47*	3.59*	4.84*
	10	0.88	1.02	1.32	1.47	1.63	1.78	2.16*	2.35*	2.75*	4.04*	5.54*
	14	1.02	1.18	1.53	1.71	1.90	2.08	2.53*	2.77*	3.27*	4.94*	7.06*
750	8	0.83	0.96	1.24	1.38	1.52	1.67	2.01*	2.18*	2.54*	3.69*	4.98*
	10	0.91	1.05	1.36	1.52	1.68	1.83	2.22*	2.42*	2.83*	4.16*	5.71*
	14	1.05	1.22	1.58	1.77	1.95	2.15	2.61*	2.86*	3.37*	5.09*	7.27*
800	8	0.85	0.98	1.27	1.42	1.56	1.71	2.06*	2.24*	2.61*	3.80*	5.12*
	10	0.93	1.08	1.40	1.56	1.72	1.88	2.28*	2.48*	2.91*	4.28*	5.87*
	14	1.08	1.25	1.62	1.82	2.01	2.21	2.69*	2.94*	3.46*	5.24*	7.47*
850	8	0.87	1.01	1.30	1.45	1.60	1.75	2.11*	2.30*	2.68*	3.89*	5.25*
	10	0.96	1.11	1.43	1.60	1.76	1.93	2.34*	2.55*	2.98*	4.39*	6.02*
	14	1.11	1.28	1.67	1.86	2.06	2.27	2.76*	3.02*	3.56*	5.38*	7.67*
900	8	0.89	1.03	1.33	1.48	1.64	1.79	2.16*	2.35*	2.74*	3.99*	5.38*
	10	0.98	1.13	1.47	1.64	1.81	1.98	2.39*	2.61*	3.06*	4.50*	6.17*
	14	1.14	1.32	1.71	1.91	2.12	2.32	2.83*	3.10*	3.65*	5.52*	7.86*
950	8	0.91	1.05	1.36	1.52	1.67	1.83	2.21*	2.40*	2.81*	4.08*	5.50*
	10	1.01	1.16	1.50	1.67	1.85	2.03	2.45*	2.67*	3.13*	4.61*	6.32*
	14	1.17	1.35	1.75	1.96	2.17	2.38	2.90*	3.17*	3.74*	5.66*	8.04*
1000	8	0.93	1.07	1.39	1.55	1.71	1.87	2.26*	2.46*	2.87*	4.17*	5.63*
	10	1.03	1.18	1.53	1.71	1.89	2.07	2.51*	2.73*	3.20*	4.72*	6.46*
	14	1.20	1.38	1.79	2.01	2.22	2.44	2.97*	3.25*	3.83*	5.79*	8.22*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.0 m (RADIUS = 2.1 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE
 TIME INDEX

CEILING HEIGHT, m

RATE
 OF RISE

(m*s) ^{1/2}	°C/min	1	2	4	5	6	7	9	10	12	18	24
50	8	0.59	0.69	0.90	1.01	1.12	1.23	1.49*	1.62*	1.92*	3.28*	7.73*
	10	0.63	0.73	0.95	1.07	1.20	1.32	1.62*	1.78*	2.16*	4.69*	13.51*
	14	0.69	0.80	1.06	1.20	1.35	1.51	1.92*	2.18*	2.89*	10.48*	34.19*
100	8	0.71	0.82	1.07	1.20	1.33	1.46	1.78*	1.95*	2.31*	3.78*	7.74*
	10	0.76	0.88	1.15	1.29	1.44	1.60	1.96*	2.16*	2.61*	4.94*	13.51*
	14	0.85	0.98	1.31	1.48	1.66	1.86	2.35*	2.64*	3.38*	10.48*	34.19*
150	8	0.80	0.92	1.21	1.35	1.50	1.65	2.01*	2.20*	2.62*	4.23*	7.86*
	10	0.86	1.00	1.31	1.47	1.64	1.81	2.23*	2.46*	2.97*	5.34*	13.51*
	14	0.97	1.13	1.50	1.70	1.91	2.13	2.69*	3.02*	3.81*	10.48*	34.19*
200	8	0.88	1.01	1.32	1.49	1.65	1.82	2.21*	2.43*	2.88*	4.62*	8.11*
	10	0.95	1.10	1.45	1.63	1.81	2.00	2.47*	2.72*	3.28*	5.75*	13.52*
	14	1.09	1.26	1.68	1.90	2.13	2.37	2.99*	3.35*	4.20*	10.52*	34.19*
250	8	0.95	1.10	1.43	1.61	1.78	1.96	2.40*	2.63*	3.12*	4.98*	8.43*
	10	1.03	1.20	1.57	1.77	1.97	2.17	2.68*	2.96*	3.56*	6.14*	13.54*
	14	1.19	1.38	1.83	2.07	2.32	2.59	3.26*	3.64*	4.55*	10.63*	34.19*
300	8	1.01	1.17	1.53	1.72	1.91	2.10	2.56*	2.81*	3.34*	5.32*	8.77*
	10	1.11	1.28	1.68	1.89	2.11	2.33	2.87*	3.17*	3.82*	6.51*	13.61*
	14	1.28	1.49	1.97	2.23	2.50	2.78	3.50*	3.92*	4.87*	10.80*	34.19*
350	8	1.07	1.24	1.62	1.82	2.02	2.23	2.72*	2.99*	3.55*	5.63*	9.12*
	10	1.18	1.37	1.79	2.01	2.24	2.48	3.06*	3.37*	4.06*	6.86*	13.72*
	14	1.37	1.59	2.10	2.38	2.67	2.97	3.73*	4.17*	5.17*	11.02*	34.19*
400	8	1.13	1.31	1.71	1.92	2.13	2.35	2.87*	3.15*	3.74*	5.92*	9.47*
	10	1.24	1.44	1.89	2.13	2.37	2.62	3.23*	3.56*	4.28*	7.19*	13.89*
	14	1.45	1.68	2.23	2.52	2.82	3.14	3.95*	4.41*	5.45*	11.28*	34.19*
450	8	1.19	1.37	1.79	2.01	2.23	2.46	3.01*	3.30*	3.92*	6.20*	9.81*
	10	1.31	1.52	1.99	2.23	2.49	2.75	3.39*	3.74*	4.49*	7.51*	14.09*
	14	1.53	1.77	2.35	2.65	2.97	3.30	4.15*	4.63*	5.72*	11.56*	34.19*
500	8	1.24	1.44	1.87	2.10	2.33	2.57	3.14*	3.45*	4.10*	6.46*	10.14*
	10	1.37	1.59	2.08	2.34	2.60	2.87	3.54*	3.91*	4.70*	7.81*	14.32*
	14	1.60	1.86	2.46	2.78	3.11	3.46	4.35*	4.85*	5.98*	11.85*	34.19*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.0 m (RADIUS = 2.1 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	1.29	1.49	1.95	2.19	2.43	2.67	3.27*	3.59*	4.27*	6.72*	10.47*
	10	1.43	1.65	2.17	2.43	2.71	2.99	3.69*	4.07*	4.89*	8.11*	14.57*
	14	1.67	1.94	2.57	2.90	3.25	3.61	4.53*	5.05*	6.23*	12.15*	34.19*
600	8	1.34	1.55	2.02	2.27	2.52	2.77	3.39*	3.72*	4.43*	6.96*	10.78*
	10	1.48	1.72	2.25	2.53	2.81	3.11	3.83*	4.23*	5.08*	8.39*	14.83*
	14	1.74	2.02	2.67	3.02	3.38	3.76	4.71*	5.25*	6.46*	12.44*	34.19*
650	8	1.39	1.60	2.09	2.35	2.60	2.87	3.51*	3.85*	4.58*	7.20*	11.09*
	10	1.54	1.78	2.33	2.62	2.92	3.22	3.97*	4.38*	5.26*	8.66*	15.10*
	14	1.81	2.10	2.77	3.13	3.51	3.90	4.89*	5.44*	6.69*	12.74*	34.19*
700	8	1.43	1.66	2.16	2.42	2.69	2.96	3.63*	3.98*	4.73*	7.43*	11.39*
	10	1.59	1.84	2.41	2.71	3.01	3.33	4.11*	4.53*	5.44*	8.93*	15.38*
	14	1.87	2.18	2.87	3.24	3.63	4.03	5.05*	5.63*	6.91*	13.03*	34.20*
750	8	1.48	1.71	2.23	2.50	2.77	3.05	3.74*	4.10*	4.88*	7.65*	11.68*
	10	1.64	1.90	2.49	2.79	3.11	3.43	4.24*	4.67*	5.61*	9.19*	15.66*
	14	1.93	2.25	2.97	3.35	3.75	4.16	5.22*	5.81*	7.13*	13.32*	34.20*
800	8	1.52	1.76	2.29	2.57	2.85	3.14	3.85*	4.22*	5.02*	7.86*	11.97*
	10	1.69	1.96	2.56	2.88	3.20	3.53	4.36*	4.81*	5.77*	9.44*	15.94*
	14	1.99	2.32	3.06	3.45	3.86	4.29	5.38*	5.98*	7.34*	13.60*	34.21*
850	8	1.56	1.81	2.36	2.64	2.93	3.23	3.95*	4.34*	5.16*	8.07*	12.25*
	10	1.74	2.01	2.64	2.96	3.29	3.63	4.48*	4.95*	5.93*	9.68*	16.22*
	14	2.05	2.39	3.15	3.55	3.97	4.41	5.53*	6.15*	7.54*	13.89*	34.22*
900	8	1.60	1.86	2.42	2.71	3.01	3.31	4.06*	4.45*	5.30*	8.28*	12.52*
	10	1.79	2.07	2.71	3.04	3.38	3.73	4.60*	5.08*	6.09*	9.92*	16.50*
	14	2.11	2.46	3.24	3.65	4.08	4.53	5.68*	6.32*	7.74*	14.16*	34.24*
950	8	1.64	1.90	2.48	2.78	3.08	3.39	4.16*	4.57*	5.43*	8.48*	12.79*
	10	1.83	2.12	2.78	3.12	3.47	3.83	4.72*	5.21*	6.25*	10.15*	16.77*
	14	2.17	2.52	3.32	3.75	4.19	4.65	5.83*	6.48*	7.93*	14.44*	34.27*
1000	8	1.68	1.95	2.54	2.84	3.16	3.47	4.26*	4.67*	5.56*	8.67*	13.05*
	10	1.88	2.17	2.84	3.19	3.55	3.92	4.84*	5.33*	6.40*	10.38*	17.05*
	14	2.22	2.59	3.41	3.84	4.30	4.77	5.97*	6.64*	8.12*	14.71*	34.30*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.0 m (RADIUS = 2.1 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
		(m*s) ^{1/2}										
50	8	0.95	1.11	1.49	1.71	1.95	2.23	3.05*	3.72*	6.28*	29.03*	99.31*
	10	1.02	1.20	1.65	1.91	2.23	2.64	4.24*	5.82*	10.96*	55.01*	191.88*
	14	1.15	1.38	1.98	2.41	3.06	4.26	9.51*	13.86*	27.72*	147.83*	522.71*
100	8	1.18	1.38	1.85	2.12	2.41	2.73	3.63*	4.26*	6.40*	29.03*	99.31*
	10	1.28	1.51	2.06	2.39	2.76	3.20	4.66*	5.97*	10.96*	55.01*	191.88*
	14	1.48	1.77	2.51	3.00	3.65	4.65	9.51*	13.86*	27.72*	147.83*	522.71*
150	8	1.36	1.59	2.14	2.44	2.77	3.14	4.13*	4.78*	6.75*	29.03*	99.31*
	10	1.49	1.76	2.40	2.77	3.18	3.67	5.16*	6.35*	10.98*	55.01*	191.88*
	14	1.74	2.08	2.93	3.47	4.17	5.13	9.55*	13.86*	27.72*	147.83*	522.71*
200	8	1.52	1.78	2.39	2.73	3.09	3.49	4.56*	5.24*	7.18*	29.03*	99.31*
	10	1.68	1.98	2.69	3.10	3.55	4.08	5.63*	6.79*	11.06*	55.01*	191.88*
	14	1.97	2.35	3.29	3.89	4.62	5.60	9.69*	13.87*	27.72*	147.83*	522.71*
250	8	1.67	1.95	2.61	2.98	3.37	3.80	4.95*	5.67*	7.62*	29.03*	99.31*
	10	1.85	2.17	2.95	3.39	3.89	4.45	6.07*	7.22*	11.23*	55.01*	191.88*
	14	2.18	2.59	3.62	4.26	5.04	6.04	9.93*	13.91*	27.72*	147.83*	522.71*
300	8	1.80	2.10	2.82	3.21	3.63	4.09	5.31*	6.06*	8.04*	29.03*	99.31*
	10	2.00	2.35	3.19	3.66	4.19	4.78	6.48*	7.65*	11.48*	55.01*	191.88*
	14	2.37	2.81	3.92	4.60	5.42	6.45	10.24*	14.00*	27.72*	147.83*	522.71*
350	8	1.92	2.25	3.01	3.43	3.88	4.36	5.65*	6.43*	8.45*	29.03*	99.31*
	10	2.14	2.52	3.41	3.92	4.47	5.10	6.86*	8.05*	11.78*	55.01*	191.88*
	14	2.54	3.02	4.20	4.92	5.78	6.84	10.57*	14.15*	27.72*	147.83*	522.71*
400	8	2.04	2.39	3.19	3.63	4.11	4.62	5.96*	6.78*	8.85*	29.03*	99.31*
	10	2.28	2.68	3.62	4.15	4.74	5.40	7.22*	8.44*	12.11*	55.01*	191.88*
	14	2.71	3.22	4.47	5.22	6.11	7.20	10.93*	14.35*	27.72*	147.83*	522.71*
450	8	2.15	2.52	3.36	3.83	4.32	4.86	6.26*	7.11*	9.23*	29.04*	99.31*
	10	2.41	2.83	3.82	4.38	4.99	5.68	7.57*	8.81*	12.46*	55.01*	191.88*
	14	2.87	3.40	4.72	5.51	6.43	7.55	11.29*	14.60*	27.72*	147.83*	522.71*
500	8	2.26	2.64	3.53	4.01	4.53	5.09	6.55*	7.42*	9.59*	29.05*	99.31*
	10	2.53	2.97	4.01	4.60	5.23	5.94	7.90*	9.17*	12.81*	55.01*	191.88*
	14	3.02	3.58	4.96	5.78	6.74	7.89	11.65*	14.87*	27.73*	147.83*	522.71*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.0 m (RADIUS = 2.1 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	2.36	2.76	3.69	4.19	4.73	5.31	6.82*	7.72*	9.94*	29.06*	99.31*	
	10	2.65	3.11	4.19	4.80	5.47	6.20	8.22*	9.52*	13.16*	55.01*	191.88*	
	14	3.17	3.75	5.19	6.04	7.03	8.21	12.00*	15.16*	27.75*	147.83*	522.71*	
600	8	2.46	2.88	3.84	4.36	4.92	5.52	7.09*	8.02*	10.28*	29.09*	99.31*	
	10	2.76	3.24	4.37	5.00	5.69	6.45	8.53*	9.85*	13.51*	55.01*	191.88*	
	14	3.31	3.92	5.41	6.29	7.31	8.52	12.35*	15.46*	27.77*	147.83*	522.71*	
650	8	2.56	2.99	3.98	4.53	5.10	5.72	7.34*	8.30*	10.61*	29.13*	99.31*	
	10	2.87	3.37	4.54	5.19	5.90	6.69	8.82*	10.17*	13.85*	55.01*	191.88*	
	14	3.44	4.08	5.62	6.53	7.58	8.82	12.69*	15.77*	27.81*	147.83*	522.71*	
700	8	2.65	3.10	4.13	4.69	5.28	5.92	7.59*	8.57*	10.93*	29.19*	99.31*	
	10	2.98	3.49	4.70	5.38	6.11	6.92	9.11*	10.49*	14.19*	55.01*	191.88*	
	14	3.57	4.23	5.83	6.77	7.84	9.11	13.03*	16.08*	27.87*	147.83*	522.71*	
750	8	2.74	3.20	4.26	4.84	5.46	6.11	7.83*	8.83*	11.25*	29.26*	99.31*	
	10	3.08	3.61	4.86	5.56	6.31	7.14	9.39*	10.79*	14.53*	55.01*	191.88*	
	14	3.70	4.38	6.03	6.99	8.10	9.39	13.36*	16.40*	27.94*	147.83*	522.71*	
800	8	2.83	3.30	4.40	4.99	5.63	6.30	8.06*	9.09*	11.55*	29.35*	99.31*	
	10	3.18	3.73	5.02	5.73	6.51	7.36	9.66*	11.09*	14.86*	55.01*	191.88*	
	14	3.83	4.53	6.22	7.21	8.34	9.67	13.68*	16.71*	28.03*	147.83*	522.71*	
850	8	2.91	3.40	4.53	5.14	5.79	6.48	8.29*	9.34*	11.85*	29.47*	99.31*	
	10	3.28	3.84	5.17	5.91	6.70	7.57	9.92*	11.38*	15.19*	55.01*	191.88*	
	14	3.95	4.67	6.41	7.43	8.59	9.93	14.00*	17.03*	28.14*	147.83*	522.71*	
900	8	3.00	3.50	4.66	5.28	5.95	6.66	8.51*	9.59*	12.14*	29.60*	99.31*	
	10	3.37	3.96	5.32	6.07	6.89	7.78	10.18*	11.66*	15.51*	55.01*	191.88*	
	14	4.07	4.81	6.60	7.64	8.82	10.19	14.31*	17.34*	28.27*	147.83*	522.71*	
950	8	3.08	3.59	4.78	5.43	6.11	6.83	8.72*	9.82*	12.42*	29.75*	99.31*	
	10	3.47	4.07	5.46	6.24	7.07	7.98	10.43*	11.94*	15.82*	55.01*	191.88*	
	14	4.18	4.94	6.78	7.84	9.05	10.45	14.61*	17.65*	28.42*	147.83*	522.71*	
1000	8	3.16	3.69	4.90	5.56	6.26	7.00	8.93*	10.06*	12.70*	29.91*	99.31*	
	10	3.56	4.17	5.60	6.39	7.25	8.18	10.68*	12.21*	16.13*	55.01*	191.88*	
	14	4.29	5.07	6.95	8.04	9.28	10.70	14.91*	17.96*	28.57*	147.83*	522.71*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.0 m (RADIUS = 2.1 m)
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	1.63	1.98	3.10	4.26	6.77	10.99	26.51*	39.38*	80.49*	438.36*	1556.9*
	10	1.80	2.24	4.07	6.91	12.08	20.24	50.35*	75.39*	155.50*	853.92*	3038.0*
	14	2.15	2.86	8.74	17.08	31.10	53.30	135.56*	204.10*	423.56*	2339.1*	8331.3*
100	8	2.10	2.55	3.85	4.93	6.95	11.00	26.51*	39.38*	80.49*	438.36*	1556.9*
	10	2.35	2.91	4.81	7.10	12.08	20.24	50.35*	75.39*	155.50*	853.92*	3038.0*
	14	2.84	3.69	8.80	17.08	31.10	53.30	135.56*	204.10*	423.56*	2339.1*	8331.3*
150	8	2.48	3.00	4.46	5.58	7.41	11.05	26.51*	39.38*	80.49*	438.36*	1556.9*
	10	2.79	3.44	5.50	7.57	12.11	20.24	50.35*	75.39*	155.50*	853.92*	3038.0*
	14	3.40	4.36	9.10	17.08	31.10	53.30	135.56*	204.10*	423.56*	2339.1*	8331.3*
200	8	2.81	3.40	5.00	6.17	7.95	11.23	26.51*	39.38*	80.49*	438.36*	1556.9*
	10	3.18	3.90	6.10	8.12	12.24	20.24	50.35*	75.39*	155.50*	853.92*	3038.0*
	14	3.88	4.94	9.57	17.09	31.10	53.30	135.56*	204.10*	423.56*	2339.1*	8331.3*
250	8	3.11	3.75	5.48	6.71	8.48	11.53	26.51*	39.38*	80.49*	438.36*	1556.9*
	10	3.52	4.31	6.66	8.68	12.49	20.25	50.35*	75.39*	155.50*	853.92*	3038.0*
	14	4.31	5.46	10.10	17.14	31.10	53.30	135.56*	204.10*	423.56*	2339.1*	8331.3*
300	8	3.39	4.08	5.92	7.20	8.99	11.90	26.51*	39.38*	80.49*	438.36*	1556.9*
	10	3.84	4.69	7.17	9.21	12.83	20.27	50.35*	75.39*	155.50*	853.92*	3038.0*
	14	4.71	5.94	10.64	17.25	31.10	53.30	135.56*	204.10*	423.56*	2339.1*	8331.3*
350	8	3.64	4.38	6.34	7.67	9.48	12.32	26.51*	39.38*	80.49*	438.36*	1556.9*
	10	4.13	5.04	7.65	9.72	13.22	20.32	50.35*	75.39*	155.50*	853.92*	3038.0*
	14	5.08	6.38	11.17	17.44	31.10	53.30	135.56*	204.10*	423.56*	2339.1*	8331.3*
400	8	3.88	4.67	6.72	8.11	9.95	12.74	26.53*	39.38*	80.49*	438.36*	1556.9*
	10	4.41	5.37	8.10	10.21	13.63	20.42	50.35*	75.39*	155.50*	853.92*	3038.0*
	14	5.42	6.80	11.69	17.69	31.10	53.30	135.56*	204.10*	423.56*	2339.1*	8331.3*
450	8	4.11	4.94	7.09	8.53	10.41	13.17	26.56*	39.38*	80.49*	438.36*	1556.9*
	10	4.68	5.69	8.53	10.68	14.06	20.56	50.35*	75.39*	155.50*	853.92*	3038.0*
	14	5.75	7.20	12.19	18.00	31.11	53.30	135.56*	204.10*	423.56*	2339.1*	8331.3*
500	8	4.33	5.20	7.44	8.92	10.84	13.60	26.61*	39.38*	80.49*	438.36*	1556.9*
	10	4.93	5.99	8.94	11.13	14.49	20.75	50.35*	75.39*	155.50*	853.92*	3038.0*
	14	6.07	7.58	12.68	18.34	31.12	53.30	135.56*	204.10*	423.56*	2339.1*	8331.3*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.0 m (RADIUS = 2.1 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	4.54	5.44	7.78	9.31	11.26	14.02	26.68*	39.38*	80.49*	438.36*	1556.9*
	10	5.17	6.28	9.33	11.57	14.92	20.97	50.35*	75.39*	155.50*	853.92*	3038.0*
	14	6.37	7.94	13.15	18.70	31.15	53.30	135.56*	204.10*	423.56*	2339.1*	8331.3*
600	8	4.75	5.68	8.11	9.67	11.67	14.43	26.79*	39.39*	80.49*	438.36*	1556.9*
	10	5.41	6.56	9.71	11.99	15.34	21.23	50.35*	75.39*	155.50*	853.92*	3038.0*
	14	6.66	8.29	13.61	19.09	31.20	53.30	135.56*	204.10*	423.56*	2339.1*	8331.3*
650	8	4.94	5.91	8.42	10.03	12.06	14.84	26.93*	39.40*	80.49*	438.36*	1556.9*
	10	5.64	6.82	10.07	12.40	15.76	21.52	50.35*	75.39*	155.50*	853.92*	3038.0*
	14	6.95	8.63	14.05	19.48	31.27	53.30	135.56*	204.10*	423.56*	2339.1*	8331.3*
700	8	5.13	6.14	8.72	10.37	12.44	15.23	27.10*	39.41*	80.49*	438.36*	1556.9*
	10	5.85	7.08	10.43	12.80	16.17	21.82	50.35*	75.39*	155.50*	853.92*	3038.0*
	14	7.22	8.96	14.49	19.87	31.36	53.30	135.56*	204.10*	423.56*	2339.1*	8331.3*
750	8	5.32	6.36	9.01	10.71	12.81	15.62	27.29*	39.44*	80.49*	438.36*	1556.9*
	10	6.07	7.34	10.77	13.18	16.57	22.14	50.35*	75.39*	155.50*	853.92*	3038.0*
	14	7.48	9.27	14.91	20.27	31.47	53.30	135.56*	204.10*	423.56*	2339.1*	8331.3*
800	8	5.49	6.57	9.30	11.03	13.17	16.01	27.50*	39.47*	80.49*	438.36*	1556.9*
	10	6.27	7.58	11.10	13.56	16.97	22.46	50.36*	75.39*	155.50*	853.92*	3038.0*
	14	7.74	9.58	15.32	20.67	31.61	53.30	135.56*	204.10*	423.56*	2339.1*	8331.3*
850	8	5.67	6.77	9.58	11.35	13.52	16.38	27.74*	39.52*	80.49*	438.36*	1556.9*
	10	6.48	7.82	11.43	13.92	17.36	22.80	50.36*	75.39*	155.50*	853.92*	3038.0*
	14	7.99	9.88	15.73	21.06	31.78	53.31	135.56*	204.10*	423.56*	2339.1*	8331.3*
900	8	5.84	6.97	9.85	11.66	13.87	16.75	27.99*	39.58*	80.49*	438.36*	1556.9*
	10	6.67	8.05	11.74	14.28	17.74	23.13	50.37*	75.39*	155.50*	853.92*	3038.0*
	14	8.24	10.17	16.12	21.46	31.96	53.31	135.56*	204.10*	423.56*	2339.1*	8331.3*
950	8	6.01	7.17	10.11	11.96	14.20	17.11	28.26*	39.65*	80.49*	438.36*	1556.9*
	10	6.86	8.28	12.05	14.63	18.12	23.47	50.38*	75.39*	155.50*	853.92*	3038.0*
	14	8.48	10.46	16.50	21.85	32.16	53.32	135.56*	204.10*	423.56*	2339.1*	8331.3*
1000	8	6.17	7.36	10.37	12.25	14.53	17.47	28.54*	39.74*	80.49*	438.36*	1556.9*
	10	7.05	8.50	12.35	14.97	18.49	23.82	50.40*	75.39*	155.50*	853.92*	3038.0*
	14	8.71	10.74	16.88	22.24	32.38	53.33	135.56*	204.10*	423.56*	2339.1*	8331.3*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.5 m (RADIUS = 2.5 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		(m*s) ^{1/2}										
		1	2	4	5	6	7	9	10	12	18	24
50	8	0.44	0.50	0.63	0.69	0.76	0.83	0.96*	1.04*	1.18*	1.65*	2.19*
	10	0.46	0.52	0.66	0.73	0.80	0.87	1.01*	1.09*	1.25*	1.79*	2.48*
	14	0.49	0.56	0.71	0.78	0.86	0.94	1.11*	1.20*	1.40*	2.11*	3.54*
100	8	0.51	0.57	0.72	0.80	0.87	0.95	1.11*	1.20*	1.37*	1.93*	2.57*
	10	0.53	0.60	0.76	0.84	0.93	1.01	1.18*	1.28*	1.47*	2.11*	2.91*
	14	0.58	0.66	0.84	0.93	1.02	1.12	1.32*	1.43*	1.67*	2.52*	3.88*
150	8	0.56	0.63	0.79	0.88	0.96	1.05	1.23*	1.32*	1.52*	2.15*	2.87*
	10	0.59	0.67	0.85	0.94	1.03	1.12	1.32*	1.42*	1.65*	2.37*	3.26*
	14	0.66	0.74	0.94	1.05	1.15	1.26	1.49*	1.62*	1.89*	2.84*	4.27*
200	8	0.60	0.68	0.86	0.95	1.04	1.13	1.33*	1.43*	1.65*	2.35*	3.13*
	10	0.65	0.73	0.92	1.02	1.12	1.22	1.43*	1.55*	1.80*	2.60*	3.56*
	14	0.72	0.82	1.04	1.15	1.27	1.38	1.63*	1.78*	2.08*	3.13*	4.63*
250	8	0.65	0.73	0.92	1.02	1.11	1.21	1.42*	1.53*	1.77*	2.52*	3.37*
	10	0.69	0.78	0.99	1.10	1.20	1.31	1.54*	1.67*	1.93*	2.80*	3.84*
	14	0.78	0.88	1.12	1.24	1.37	1.49	1.76*	1.92*	2.25*	3.38*	4.96*
300	8	0.68	0.77	0.97	1.08	1.18	1.28	1.50*	1.63*	1.88*	2.68*	3.59*
	10	0.74	0.83	1.05	1.16	1.28	1.39	1.63*	1.77*	2.06*	2.99*	4.09*
	14	0.83	0.94	1.20	1.33	1.46	1.60	1.89*	2.05*	2.40*	3.62*	5.27*
350	8	0.72	0.81	1.02	1.13	1.24	1.35	1.58*	1.71*	1.98*	2.83*	3.79*
	10	0.78	0.88	1.11	1.23	1.35	1.47	1.73*	1.87*	2.17*	3.16*	4.32*
	14	0.88	1.00	1.27	1.41	1.55	1.69	2.00*	2.18*	2.55*	3.84*	5.57*
400	8	0.75	0.85	1.07	1.18	1.30	1.41	1.65*	1.79*	2.07*	2.97*	3.98*
	10	0.82	0.92	1.16	1.29	1.41	1.54	1.81*	1.97*	2.28*	3.32*	4.54*
	14	0.93	1.05	1.33	1.48	1.63	1.78	2.10*	2.29*	2.69*	4.04*	5.84*
450	8	0.78	0.88	1.11	1.23	1.35	1.47	1.72*	1.87*	2.16*	3.10*	4.16*
	10	0.85	0.96	1.22	1.35	1.48	1.61	1.89*	2.05*	2.39*	3.48*	4.75*
	14	0.98	1.10	1.40	1.55	1.71	1.86	2.20*	2.40*	2.82*	4.24*	6.10*
500	8	0.82	0.92	1.16	1.28	1.41	1.53	1.79*	1.94*	2.25*	3.23*	4.33*
	10	0.89	1.00	1.26	1.40	1.54	1.68	1.97*	2.14*	2.49*	3.62*	4.95*
	14	1.02	1.15	1.46	1.62	1.78	1.95	2.30*	2.51*	2.94*	4.42*	6.35*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.5 m (RADIUS = 2.5 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}	°C/min											
550	8	0.84	0.95	1.20	1.33	1.46	1.58	1.86*	2.01*	2.33*	3.35*	4.49*
	10	0.92	1.04	1.31	1.45	1.60	1.74	2.04*	2.22*	2.58*	3.76*	5.15*
	14	1.06	1.20	1.52	1.68	1.85	2.02	2.39*	2.61*	3.06*	4.60*	6.59*
600	8	0.87	0.98	1.24	1.37	1.50	1.64	1.92*	2.08*	2.41*	3.47*	4.65*
	10	0.95	1.08	1.36	1.50	1.65	1.80	2.12*	2.30*	2.68*	3.90*	5.33*
	14	1.10	1.24	1.57	1.75	1.92	2.10	2.48*	2.71*	3.18*	4.77*	6.83*
650	8	0.90	1.01	1.28	1.41	1.55	1.69	1.98*	2.15*	2.49*	3.58*	4.80*
	10	0.99	1.11	1.40	1.55	1.71	1.86	2.18*	2.37*	2.76*	4.03*	5.51*
	14	1.14	1.29	1.63	1.81	1.99	2.17	2.57*	2.80*	3.29*	4.94*	7.05*
700	8	0.93	1.04	1.32	1.46	1.60	1.74	2.04*	2.21*	2.56*	3.69*	4.95*
	10	1.02	1.15	1.45	1.60	1.76	1.92	2.25*	2.45*	2.85*	4.16*	5.68*
	14	1.18	1.33	1.68	1.87	2.05	2.24	2.65*	2.89*	3.39*	5.10*	7.27*
750	8	0.95	1.07	1.35	1.50	1.64	1.79	2.09*	2.27*	2.64*	3.80*	5.09*
	10	1.05	1.18	1.49	1.65	1.81	1.97	2.32*	2.52*	2.93*	4.28*	5.85*
	14	1.21	1.37	1.73	1.92	2.12	2.31	2.73*	2.98*	3.50*	5.25*	7.48*
800	8	0.98	1.10	1.39	1.54	1.68	1.83	2.15*	2.33*	2.71*	3.90*	5.23*
	10	1.07	1.21	1.53	1.69	1.86	2.02	2.38*	2.59*	3.02*	4.40*	6.01*
	14	1.25	1.41	1.78	1.98	2.18	2.38	2.81*	3.07*	3.60*	5.40*	7.68*
850	8	1.00	1.13	1.42	1.57	1.73	1.88	2.20*	2.39*	2.77*	4.00*	5.37*
	10	1.10	1.24	1.57	1.74	1.91	2.08	2.44*	2.66*	3.09*	4.52*	6.17*
	14	1.28	1.45	1.83	2.03	2.24	2.44	2.89*	3.15*	3.70*	5.55*	7.88*
900	8	1.03	1.16	1.46	1.61	1.77	1.92	2.25*	2.45*	2.84*	4.10*	5.50*
	10	1.13	1.27	1.61	1.78	1.95	2.13	2.50*	2.72*	3.17*	4.63*	6.32*
	14	1.31	1.49	1.88	2.09	2.29	2.51	2.96*	3.23*	3.80*	5.70*	8.08*
950	8	1.05	1.18	1.49	1.65	1.81	1.97	2.31*	2.50*	2.91*	4.20*	5.63*
	10	1.16	1.30	1.65	1.82	2.00	2.18	2.56*	2.79*	3.25*	4.75*	6.47*
	14	1.35	1.52	1.93	2.14	2.35	2.57	3.04*	3.31*	3.89*	5.84*	8.27*
1000	8	1.07	1.21	1.52	1.68	1.85	2.01	2.36*	2.56*	2.97*	4.29*	5.76*
	10	1.18	1.33	1.68	1.86	2.04	2.23	2.62*	2.85*	3.32*	4.86*	6.62*
	14	1.38	1.56	1.97	2.19	2.41	2.63	3.11*	3.39*	3.98*	5.97*	8.45*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.5 m (RADIUS = 2.5 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		TIME INDEX										
		1	2	4	5	6	7	9	10	12	18	24
50	8	0.67	0.76	0.97	1.08	1.19	1.31	1.55*	1.69*	2.00*	3.45*	8.28*
	10	0.71	0.81	1.03	1.15	1.28	1.41	1.70*	1.87*	2.26*	5.09*	14.58*
	14	0.78	0.89	1.16	1.30	1.46	1.63	2.04*	2.31*	3.12*	11.54*	37.08*
100	8	0.80	0.91	1.16	1.29	1.42	1.56	1.86*	2.03*	2.40*	3.94*	8.29*
	10	0.86	0.98	1.25	1.40	1.55	1.71	2.05*	2.26*	2.73*	5.27*	14.58*
	14	0.97	1.10	1.43	1.61	1.80	2.00	2.48*	2.80*	3.60*	11.54*	37.08*
150	8	0.91	1.03	1.31	1.46	1.61	1.77	2.10*	2.30*	2.72*	4.40*	8.37*
	10	0.98	1.12	1.43	1.60	1.77	1.95	2.34*	2.58*	3.10*	5.65*	14.58*
	14	1.12	1.27	1.65	1.85	2.07	2.30	2.85*	3.19*	4.04*	11.54*	37.08*
200	8	1.00	1.13	1.44	1.61	1.78	1.95	2.32*	2.54*	3.00*	4.80*	8.58*
	10	1.09	1.24	1.58	1.77	1.96	2.15	2.59*	2.85*	3.43*	6.05*	14.58*
	14	1.25	1.42	1.84	2.07	2.31	2.56	3.16*	3.53*	4.44*	11.56*	37.08*
250	8	1.08	1.23	1.56	1.74	1.92	2.11	2.51*	2.75*	3.25*	5.17*	8.87*
	10	1.18	1.34	1.72	1.92	2.13	2.34	2.81*	3.10*	3.72*	6.44*	14.60*
	14	1.36	1.56	2.01	2.26	2.52	2.80	3.44*	3.84*	4.80*	11.62*	37.08*
300	8	1.16	1.31	1.67	1.86	2.06	2.25	2.69*	2.94*	3.48*	5.51*	9.20*
	10	1.27	1.44	1.85	2.06	2.28	2.51	3.02*	3.32*	3.99*	6.81*	14.64*
	14	1.47	1.68	2.17	2.44	2.72	3.01	3.70*	4.13*	5.13*	11.75*	37.08*
350	8	1.23	1.40	1.78	1.98	2.18	2.39	2.85*	3.12*	3.69*	5.83*	9.54*
	10	1.35	1.54	1.97	2.19	2.43	2.67	3.21*	3.53*	4.23*	7.17*	14.72*
	14	1.57	1.79	2.32	2.60	2.90	3.21	3.94*	4.39*	5.44*	11.93*	37.08*
400	8	1.30	1.47	1.88	2.09	2.30	2.52	3.00*	3.29*	3.89*	6.13*	9.88*
	10	1.43	1.62	2.08	2.32	2.57	2.82	3.39*	3.73*	4.47*	7.51*	14.84*
	14	1.67	1.90	2.46	2.76	3.07	3.40	4.17*	4.64*	5.74*	12.15*	37.08*
450	8	1.37	1.55	1.97	2.19	2.41	2.65	3.15*	3.45*	4.08*	6.42*	10.22*
	10	1.51	1.71	2.18	2.44	2.70	2.96	3.56*	3.92*	4.69*	7.83*	15.01*
	14	1.76	2.01	2.59	2.90	3.23	3.58	4.38*	4.88*	6.02*	12.40*	37.08*
500	8	1.43	1.62	2.06	2.29	2.52	2.76	3.29*	3.60*	4.27*	6.69*	10.55*
	10	1.58	1.79	2.29	2.55	2.82	3.10	3.72*	4.10*	4.90*	8.14*	15.21*
	14	1.85	2.10	2.71	3.04	3.39	3.75	4.59*	5.10*	6.29*	12.67*	37.08*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.5 m (RADIUS = 2.5 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE RATE
 TIME INDEX OF RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C/min	1	2	4	5	6	7	9	10	12	18	24
550	8	1.49	1.68	2.14	2.38	2.63	2.88	3.43*	3.75*	4.44*	6.95*	10.88*
	10	1.64	1.87	2.38	2.66	2.94	3.23	3.88*	4.27*	5.11*	8.44*	15.43*
	14	1.93	2.20	2.84	3.18	3.54	3.92	4.78*	5.32*	6.54*	12.95*	37.08*
600	8	1.54	1.75	2.22	2.47	2.73	2.99	3.55*	3.89*	4.61*	7.21*	11.20*
	10	1.71	1.94	2.48	2.76	3.06	3.36	4.03*	4.43*	5.30*	8.73*	15.67*
	14	2.01	2.29	2.95	3.31	3.68	4.07	4.97*	5.53*	6.79*	13.23*	37.08*
650	8	1.60	1.81	2.30	2.56	2.82	3.09	3.68*	4.03*	4.77*	7.45*	11.51*
	10	1.77	2.01	2.57	2.86	3.17	3.48	4.17*	4.59*	5.49*	9.02*	15.93*
	14	2.09	2.38	3.06	3.43	3.82	4.23	5.15*	5.73*	7.03*	13.52*	37.08*
700	8	1.65	1.87	2.38	2.64	2.92	3.19	3.80*	4.16*	4.93*	7.69*	11.81*
	10	1.83	2.08	2.66	2.96	3.27	3.60	4.31*	4.75*	5.68*	9.29*	16.19*
	14	2.16	2.46	3.17	3.56	3.95	4.37	5.33*	5.92*	7.26*	13.81*	37.09*
750	8	1.70	1.93	2.45	2.73	3.01	3.29	3.92*	4.29*	5.08*	7.91*	12.11*
	10	1.89	2.15	2.74	3.06	3.38	3.71	4.45*	4.89*	5.85*	9.55*	16.46*
	14	2.24	2.55	3.28	3.67	4.09	4.52	5.50*	6.11*	7.48*	14.09*	37.09*
800	8	1.75	1.98	2.52	2.81	3.09	3.39	4.03*	4.42*	5.23*	8.14*	12.40*
	10	1.95	2.21	2.82	3.15	3.48	3.82	4.58*	5.04*	6.03*	9.81*	16.73*
	14	2.31	2.63	3.38	3.79	4.21	4.66	5.67*	6.29*	7.70*	14.38*	37.09*
850	8	1.80	2.04	2.59	2.88	3.18	3.48	4.14*	4.54*	5.37*	8.35*	12.68*
	10	2.01	2.28	2.91	3.24	3.58	3.93	4.71*	5.18*	6.19*	10.06*	17.01*
	14	2.38	2.71	3.48	3.90	4.34	4.79	5.83*	6.47*	7.91*	14.66*	37.10*
900	8	1.85	2.10	2.66	2.96	3.26	3.57	4.25*	4.66*	5.51*	8.56*	12.96*
	10	2.06	2.34	2.98	3.33	3.68	4.04	4.84*	5.32*	6.36*	10.31*	17.28*
	14	2.44	2.78	3.58	4.01	4.46	4.92	5.99*	6.65*	8.12*	14.94*	37.11*
950	8	1.90	2.15	2.73	3.03	3.35	3.66	4.36*	4.77*	5.65*	8.77*	13.23*
	10	2.12	2.40	3.06	3.41	3.77	4.14	4.96*	5.46*	6.52*	10.55*	17.55*
	14	2.51	2.86	3.68	4.12	4.57	5.05	6.14*	6.82*	8.32*	15.21*	37.12*
1000	8	1.94	2.20	2.80	3.11	3.43	3.75	4.46*	4.89*	5.79*	8.97*	13.50*
	10	2.17	2.46	3.14	3.50	3.86	4.24	5.08*	5.59*	6.67*	10.78*	17.83*
	14	2.58	2.93	3.77	4.22	4.69	5.18	6.29*	6.98*	8.52*	15.48*	37.14*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.5 m (RADIUS = 2.5 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	1.08	1.24	1.63	1.86	2.12	2.42	3.32*	4.13*	7.10*	32.17*	107.92*
	10	1.17	1.35	1.81	2.10	2.45	2.91	4.86*	6.71*	12.54*	61.10*	208.66*
	14	1.33	1.56	2.21	2.71	3.51	5.07	11.24*	16.25*	31.98*	164.49*	568.70*
100	8	1.35	1.55	2.03	2.31	2.62	2.97	3.90*	4.62*	7.16*	32.17*	107.92*
	10	1.47	1.70	2.28	2.62	3.03	3.52	5.17*	6.78*	12.54*	61.10*	208.66*
	14	1.71	2.00	2.80	3.35	4.11	5.35	11.24*	16.25*	31.98*	164.49*	568.70*
150	8	1.56	1.79	2.36	2.67	3.02	3.41	4.41*	5.13*	7.42*	32.17*	107.92*
	10	1.72	1.99	2.65	3.04	3.49	4.03	5.64*	7.06*	12.54*	61.10*	208.66*
	14	2.02	2.36	3.27	3.87	4.66	5.82	11.24*	16.25*	31.98*	164.49*	568.70*
200	8	1.75	2.01	2.63	2.98	3.37	3.79	4.86*	5.61*	7.80*	32.17*	107.92*
	10	1.94	2.24	2.98	3.41	3.90	4.47	6.11*	7.46*	12.57*	61.10*	208.66*
	14	2.29	2.67	3.68	4.33	5.16	6.30	11.30*	16.25*	31.98*	164.49*	568.70*
250	8	1.92	2.20	2.88	3.27	3.68	4.14	5.27*	6.05*	8.22*	32.17*	107.92*
	10	2.13	2.46	3.27	3.74	4.26	4.87	6.56*	7.88*	12.67*	61.10*	208.66*
	14	2.53	2.95	4.05	4.75	5.61	6.76	11.44*	16.26*	31.98*	164.49*	568.70*
300	8	2.08	2.38	3.11	3.52	3.97	4.45	5.65*	6.46*	8.64*	32.17*	107.92*
	10	2.31	2.66	3.53	4.04	4.60	5.24	6.98*	8.30*	12.84*	61.10*	208.66*
	14	2.75	3.20	4.38	5.12	6.03	7.20	11.66*	16.30*	31.98*	164.49*	568.70*
350	8	2.22	2.55	3.33	3.76	4.23	4.75	6.00*	6.84*	9.06*	32.17*	107.92*
	10	2.48	2.86	3.78	4.32	4.91	5.58	7.38*	8.71*	13.08*	61.10*	208.66*
	14	2.96	3.44	4.70	5.48	6.42	7.62	11.94*	16.37*	31.98*	164.49*	568.70*
400	8	2.36	2.70	3.53	3.99	4.49	5.02	6.34*	7.20*	9.46*	32.17*	107.92*
	10	2.64	3.04	4.02	4.58	5.20	5.91	7.76*	9.10*	13.36*	61.10*	208.66*
	14	3.15	3.67	4.99	5.81	6.79	8.01	12.25*	16.49*	31.98*	164.49*	568.70*
450	8	2.49	2.85	3.72	4.21	4.72	5.29	6.65*	7.55*	9.84*	32.17*	107.92*
	10	2.79	3.21	4.24	4.83	5.48	6.21	8.12*	9.49*	13.67*	61.10*	208.66*
	14	3.34	3.88	5.27	6.13	7.14	8.39	12.58*	16.65*	31.98*	164.49*	568.70*
500	8	2.61	2.99	3.91	4.41	4.95	5.54	6.95*	7.88*	10.22*	32.17*	107.92*
	10	2.93	3.37	4.45	5.07	5.75	6.51	8.47*	9.85*	13.99*	61.10*	208.66*
	14	3.51	4.09	5.54	6.43	7.47	8.75	12.92*	16.85*	31.98*	164.49*	568.70*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.5 m (RADIUS = 2.5 m)³
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	2.73	3.13	4.08	4.61	5.17	5.78	7.24*	8.19*	10.58*	32.18*	107.92*
	10	3.07	3.53	4.66	5.30	6.00	6.79	8.80*	10.21*	14.33*	61.10*	208.66*
	14	3.68	4.28	5.80	6.72	7.79	9.10	13.26*	17.09*	31.99*	164.49*	568.70*
600	8	2.85	3.26	4.25	4.80	5.38	6.01	7.52*	8.50*	10.93*	32.19*	107.92*
	10	3.20	3.68	4.85	5.52	6.25	7.06	9.12*	10.56*	14.66*	61.10*	208.66*
	14	3.85	4.47	6.04	6.99	8.10	9.44	13.60*	17.34*	32.00*	164.49*	568.70*
650	8	2.96	3.39	4.41	4.98	5.58	6.23	7.79*	8.79*	11.27*	32.21*	107.92*
	10	3.33	3.83	5.04	5.73	6.48	7.32	9.43*	10.89*	15.00*	61.10*	208.66*
	14	4.01	4.65	6.28	7.26	8.40	9.77	13.94*	17.61*	32.01*	164.49*	568.70*
700	8	3.07	3.51	4.57	5.16	5.78	6.45	8.05*	9.08*	11.60*	32.24*	107.92*
	10	3.45	3.97	5.23	5.94	6.71	7.57	9.73*	11.22*	15.34*	61.10*	208.66*
	14	4.16	4.83	6.51	7.52	8.69	10.08	14.28*	17.90*	32.03*	164.49*	568.70*
750	8	3.17	3.63	4.73	5.33	5.97	6.66	8.30*	9.36*	11.93*	32.28*	107.92*
	10	3.57	4.11	5.40	6.14	6.93	7.81	10.03*	11.54*	15.67*	61.10*	208.66*
	14	4.31	5.00	6.74	7.77	8.97	10.39	14.61*	18.19*	32.06*	164.49*	568.70*
800	8	3.28	3.75	4.87	5.49	6.15	6.86	8.54*	9.63*	12.24*	32.34*	107.92*
	10	3.69	4.24	5.58	6.33	7.15	8.05	10.31*	11.85*	16.01*	61.10*	208.66*
	14	4.45	5.17	6.95	8.02	9.24	10.69	14.94*	18.48*	32.11*	164.49*	568.70*
850	8	3.38	3.86	5.02	5.66	6.33	7.06	8.78*	9.89*	12.55*	32.41*	107.92*
	10	3.81	4.37	5.75	6.52	7.36	8.28	10.59*	12.15*	16.33*	61.10*	208.66*
	14	4.60	5.33	7.16	8.26	9.51	10.98	15.26*	18.79*	32.16*	164.49*	568.70*
900	8	3.47	3.97	5.16	5.82	6.51	7.26	9.01*	10.14*	12.85*	32.50*	107.92*
	10	3.92	4.50	5.91	6.70	7.56	8.51	10.86*	12.44*	16.66*	61.10*	208.66*
	14	4.73	5.49	7.37	8.49	9.76	11.26	15.58*	19.09*	32.23*	164.49*	568.70*
950	8	3.57	4.08	5.30	5.97	6.68	7.44	9.24*	10.39*	13.14*	32.60*	107.92*
	10	4.03	4.63	6.07	6.88	7.76	8.73	11.12*	12.73*	16.98*	61.10*	208.66*
	14	4.87	5.64	7.57	8.71	10.02	11.54	15.90*	19.39*	32.32*	164.49*	568.70*
1000	8	3.66	4.19	5.44	6.12	6.85	7.63	9.46*	10.64*	13.43*	32.72*	107.92*
	10	4.13	4.75	6.23	7.06	7.96	8.95	11.38*	13.02*	17.29*	61.10*	208.66*
	14	5.00	5.80	7.77	8.94	10.26	11.81	16.20*	19.69*	32.42*	164.49*	568.70*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.5 m (RADIUS = 2.5 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	1.88	2.26	3.56	5.12	8.33	13.40	31.60*	46.44*	93.16*	488.07*	1694.1*
	10	2.09	2.59	4.98	8.74	15.09	24.90	60.24*	89.14*	180.20*	950.97*	3306.0*
	14	2.53	3.41	11.53	22.02	39.25	65.99	162.62*	241.74*	491.27*	2605.3*	9066.7*
100	8	2.44	2.91	4.38	5.72	8.41	13.40	31.60*	46.44*	93.16*	488.07*	1694.1*
	10	2.74	3.35	5.66	8.81	15.09	24.90	60.24*	89.14*	180.20*	950.97*	3306.0*
	14	3.35	4.35	11.54	22.02	39.25	65.99	162.62*	241.74*	491.27*	2605.3*	9066.7*
150	8	2.88	3.43	5.06	6.39	8.74	13.42	31.60*	46.44*	93.16*	488.07*	1694.1*
	10	3.26	3.96	6.38	9.13	15.09	24.90	60.24*	89.14*	180.20*	950.97*	3306.0*
	14	4.00	5.12	11.65	22.02	39.25	65.99	162.62*	241.74*	491.27*	2605.3*	9066.7*
200	8	3.27	3.89	5.66	7.02	9.23	13.50	31.60*	46.44*	93.16*	488.07*	1694.1*
	10	3.71	4.49	7.04	9.62	15.14	24.90	60.24*	89.14*	180.20*	950.97*	3306.0*
	14	4.57	5.78	11.94	22.02	39.25	65.99	162.62*	241.74*	491.27*	2605.3*	9066.7*
250	8	3.62	4.29	6.19	7.61	9.75	13.69	31.60*	46.44*	93.16*	488.07*	1694.1*
	10	4.11	4.96	7.65	10.16	15.26	24.90	60.24*	89.14*	180.20*	950.97*	3306.0*
	14	5.07	6.38	12.37	22.03	39.25	65.99	162.62*	241.74*	491.27*	2605.3*	9066.7*
300	8	3.94	4.67	6.69	8.15	10.28	13.98	31.60*	46.44*	93.16*	488.07*	1694.1*
	10	4.49	5.40	8.21	10.70	15.48	24.90	60.24*	89.14*	180.20*	950.97*	3306.0*
	14	5.54	6.93	12.87	22.06	39.25	65.99	162.62*	241.74*	491.27*	2605.3*	9066.7*
350	8	4.24	5.02	7.15	8.66	10.80	14.34	31.60*	46.44*	93.16*	488.07*	1694.1*
	10	4.83	5.80	8.74	11.24	15.78	24.92	60.24*	89.14*	180.20*	950.97*	3306.0*
	14	5.98	7.44	13.39	22.13	39.25	65.99	162.62*	241.74*	491.27*	2605.3*	9066.7*
400	8	4.53	5.34	7.58	9.14	11.30	14.73	31.60*	46.44*	93.16*	488.07*	1694.1*
	10	5.16	6.19	9.25	11.76	16.14	24.95	60.24*	89.14*	180.20*	950.97*	3306.0*
	14	6.38	7.92	13.92	22.25	39.25	65.99	162.62*	241.74*	491.27*	2605.3*	9066.7*
450	8	4.79	5.66	8.00	9.60	11.78	15.15	31.61*	46.44*	93.16*	488.07*	1694.1*
	10	5.47	6.55	9.72	12.27	16.53	25.02	60.24*	89.14*	180.20*	950.97*	3306.0*
	14	6.77	8.38	14.44	22.43	39.25	65.99	162.62*	241.74*	491.27*	2605.3*	9066.7*
500	8	5.05	5.95	8.39	10.04	12.25	15.57	31.62*	46.44*	93.16*	488.07*	1694.1*
	10	5.77	6.90	10.18	12.75	16.94	25.12	60.24*	89.14*	180.20*	950.97*	3306.0*
	14	7.14	8.82	14.95	22.66	39.25	65.99	162.62*	241.74*	491.27*	2605.3*	9066.7*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 3.5 m (RADIUS = 2.5 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	5.30	6.24	8.77	10.46	12.70	16.00	31.64*	46.44*	93.16*	488.07*	1694.1*
	10	6.05	7.23	10.62	13.23	17.36	25.25	60.24*	89.14*	180.20*	950.97*	3306.0*
	14	7.50	9.24	15.46	22.93	39.26	65.99	162.62*	241.74*	491.27*	2605.3*	9066.7*
600	8	5.53	6.51	9.13	10.87	13.14	16.42	31.68*	46.44*	93.16*	488.07*	1694.1*
	10	6.33	7.55	11.04	13.69	17.78	25.43	60.24*	89.14*	180.20*	950.97*	3306.0*
	14	7.84	9.64	15.95	23.24	39.27	65.99	162.62*	241.74*	491.27*	2605.3*	9066.7*
650	8	5.76	6.78	9.48	11.26	13.57	16.85	31.74*	46.44*	93.16*	488.07*	1694.1*
	10	6.59	7.85	11.45	14.13	18.21	25.63	60.24*	89.14*	180.20*	950.97*	3306.0*
	14	8.17	10.03	16.43	23.57	39.29	65.99	162.62*	241.74*	491.27*	2605.3*	9066.7*
700	8	5.99	7.04	9.82	11.64	13.99	17.26	31.82*	46.45*	93.16*	488.07*	1694.1*
	10	6.85	8.15	11.84	14.57	18.63	25.87	60.24*	89.14*	180.20*	950.97*	3306.0*
	14	8.49	10.40	16.90	23.92	39.32	65.99	162.62*	241.74*	491.27*	2605.3*	9066.7*
750	8	6.20	7.28	10.14	12.01	14.39	17.67	31.93*	46.45*	93.16*	488.07*	1694.1*
	10	7.10	8.44	12.22	14.99	19.05	26.13	60.24*	89.14*	180.20*	950.97*	3306.0*
	14	8.80	10.77	17.36	24.29	39.36	65.99	162.62*	241.74*	491.27*	2605.3*	9066.7*
800	8	6.41	7.53	10.46	12.37	14.78	18.08	32.05*	46.46*	93.16*	488.07*	1694.1*
	10	7.34	8.72	12.60	15.40	19.47	26.41	60.24*	89.14*	180.20*	950.97*	3306.0*
	14	9.11	11.12	17.82	24.66	39.42	65.99	162.62*	241.74*	491.27*	2605.3*	9066.7*
850	8	6.62	7.76	10.77	12.72	15.17	18.47	32.20*	46.48*	93.16*	488.07*	1694.1*
	10	7.58	9.00	12.96	15.80	19.88	26.70	60.24*	89.14*	180.20*	950.97*	3306.0*
	14	9.40	11.47	18.26	25.05	39.49	65.99	162.62*	241.74*	491.27*	2605.3*	9066.7*
900	8	6.82	7.99	11.08	13.06	15.54	18.87	32.37*	46.50*	93.16*	488.07*	1694.1*
	10	7.81	9.27	13.31	16.20	20.28	27.01	60.25*	89.14*	180.20*	950.97*	3306.0*
	14	9.69	11.80	18.69	25.43	39.58	65.99	162.62*	241.74*	491.27*	2605.3*	9066.7*
950	8	7.01	8.22	11.37	13.40	15.91	19.25	32.56*	46.52*	93.16*	488.07*	1694.1*
	10	8.03	9.53	13.66	16.58	20.68	27.33	60.25*	89.14*	180.20*	950.97*	3306.0*
	14	9.97	12.13	19.11	25.82	39.70	65.99	162.62*	241.74*	491.27*	2605.3*	9066.7*
1000	8	7.20	8.44	11.66	13.72	16.27	19.63	32.77*	46.56*	93.16*	488.07*	1694.1*
	10	8.25	9.78	14.00	16.96	21.08	27.66	60.25*	89.14*	180.20*	950.97*	3306.0*
	14	10.24	12.46	19.53	26.22	39.83	65.99	162.62*	241.74*	491.27*	2605.3*	9066.7*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 m (RADIUS = 2.8 m)
FIRE GROWTH: ULTRAFast (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	0.49	0.54	0.67	0.74	0.80	0.87	1.00	1.07*	1.22*	1.69*	2.24*
	10	0.51	0.57	0.70	0.77	0.84	0.91	1.06	1.13*	1.29*	1.83*	2.54*
	14	0.55	0.61	0.76	0.84	0.92	1.00	1.16	1.25*	1.45*	2.18*	3.73*
100	8	0.57	0.63	0.77	0.85	0.93	1.00	1.16	1.24*	1.41*	1.98*	2.63*
	10	0.60	0.66	0.82	0.90	0.98	1.07	1.23	1.32*	1.52*	2.17*	2.98*
	14	0.66	0.73	0.90	1.00	1.09	1.19	1.38	1.49*	1.73*	2.60*	4.04*
150	8	0.63	0.69	0.85	0.94	1.02	1.11	1.28	1.37*	1.57*	2.21*	2.94*
	10	0.67	0.74	0.91	1.00	1.10	1.19	1.38	1.48*	1.70*	2.44*	3.34*
	14	0.74	0.82	1.02	1.12	1.23	1.34	1.56	1.68*	1.96*	2.93*	4.43*
200	8	0.68	0.75	0.93	1.02	1.11	1.20	1.39	1.49*	1.71*	2.41*	3.20*
	10	0.73	0.80	0.99	1.09	1.19	1.30	1.50	1.61*	1.86*	2.67*	3.65*
	14	0.81	0.90	1.12	1.24	1.35	1.47	1.72	1.85*	2.15*	3.23*	4.79*
250	8	0.73	0.80	0.99	1.09	1.19	1.29	1.49	1.59*	1.83*	2.58*	3.44*
	10	0.78	0.86	1.07	1.18	1.28	1.39	1.61	1.73*	2.00*	2.88*	3.93*
	14	0.88	0.98	1.21	1.34	1.46	1.59	1.86	2.00*	2.33*	3.49*	5.12*
300	8	0.77	0.85	1.05	1.15	1.26	1.36	1.57	1.69*	1.94*	2.75*	3.67*
	10	0.83	0.92	1.14	1.25	1.37	1.48	1.72	1.84*	2.13*	3.07*	4.19*
	14	0.94	1.05	1.30	1.43	1.56	1.70	1.98	2.14*	2.49*	3.73*	5.44*
350	8	0.81	0.90	1.11	1.21	1.32	1.43	1.66	1.78*	2.04*	2.90*	3.87*
	10	0.88	0.97	1.20	1.32	1.44	1.56	1.81	1.95*	2.25*	3.25*	4.43*
	14	1.00	1.11	1.38	1.52	1.66	1.81	2.10	2.27*	2.65*	3.96*	5.74*
400	8	0.85	0.94	1.16	1.27	1.39	1.50	1.74	1.86*	2.14*	3.05*	4.07*
	10	0.92	1.02	1.26	1.39	1.51	1.64	1.90	2.04*	2.36*	3.41*	4.66*
	14	1.05	1.17	1.45	1.60	1.75	1.90	2.22	2.39*	2.79*	4.17*	6.02*
450	8	0.88	0.98	1.21	1.33	1.45	1.57	1.81	1.94*	2.24*	3.18*	4.25*
	10	0.96	1.07	1.32	1.45	1.58	1.72	1.99	2.14*	2.47*	3.57*	4.87*
	14	1.10	1.23	1.52	1.68	1.83	1.99	2.32	2.50*	2.92*	4.37*	6.29*
500	8	0.92	1.02	1.26	1.38	1.50	1.63	1.88	2.02*	2.33*	3.31*	4.43*
	10	1.00	1.11	1.37	1.51	1.65	1.79	2.07	2.22*	2.58*	3.72*	5.08*
	14	1.15	1.28	1.59	1.75	1.91	2.08	2.43	2.61*	3.05*	4.56*	6.54*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 m (RADIUS = 2.8 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	0.95	1.05	1.30	1.43	1.56	1.69	1.95	2.09*	2.41*	3.44*	4.59*
	10	1.04	1.15	1.43	1.57	1.71	1.86	2.15	2.31*	2.68*	3.87*	5.27*
	14	1.20	1.33	1.65	1.82	1.99	2.17	2.52	2.72*	3.18*	4.74*	6.79*
600	8	0.99	1.09	1.35	1.48	1.61	1.75	2.02	2.16*	2.50*	3.56*	4.76*
	10	1.08	1.19	1.48	1.62	1.77	1.92	2.23	2.39*	2.77*	4.01*	5.46*
	14	1.25	1.38	1.71	1.89	2.07	2.25	2.62	2.82*	3.30*	4.92*	7.03*
650	8	1.02	1.13	1.39	1.52	1.66	1.80	2.08	2.23*	2.58*	3.68*	4.91*
	10	1.11	1.23	1.53	1.68	1.83	1.99	2.30	2.47*	2.86*	4.15*	5.64*
	14	1.29	1.43	1.78	1.96	2.14	2.33	2.71	2.92*	3.41*	5.09*	7.25*
700	8	1.05	1.16	1.43	1.57	1.71	1.85	2.14	2.30*	2.65*	3.79*	5.06*
	10	1.15	1.27	1.57	1.73	1.89	2.05	2.37	2.55*	2.95*	4.28*	5.82*
	14	1.33	1.48	1.83	2.02	2.21	2.40	2.80	3.01*	3.52*	5.25*	7.48*
750	8	1.08	1.19	1.47	1.61	1.76	1.91	2.20	2.36*	2.73*	3.90*	5.21*
	10	1.18	1.31	1.62	1.78	1.94	2.11	2.44	2.62*	3.04*	4.40*	5.99*
	14	1.37	1.53	1.89	2.08	2.28	2.48	2.88	3.11*	3.63*	5.41*	7.69*
800	8	1.11	1.22	1.51	1.66	1.81	1.96	2.26	2.42*	2.80*	4.00*	5.35*
	10	1.22	1.35	1.66	1.83	2.00	2.17	2.51	2.69*	3.12*	4.53*	6.16*
	14	1.41	1.57	1.95	2.14	2.34	2.55	2.97	3.20*	3.74*	5.57*	7.90*
850	8	1.13	1.25	1.55	1.70	1.85	2.01	2.32	2.49*	2.87*	4.11*	5.49*
	10	1.25	1.38	1.71	1.88	2.05	2.22	2.57	2.76*	3.21*	4.65*	6.32*
	14	1.45	1.61	2.00	2.20	2.41	2.62	3.05	3.28*	3.84*	5.72*	8.11*
900	8	1.16	1.28	1.58	1.74	1.90	2.05	2.37	2.55*	2.94*	4.21*	5.63*
	10	1.28	1.42	1.75	1.92	2.10	2.28	2.64	2.83*	3.29*	4.77*	6.48*
	14	1.49	1.66	2.05	2.26	2.47	2.69	3.13	3.37*	3.94*	5.87*	8.30*
950	8	1.19	1.31	1.62	1.78	1.94	2.10	2.43	2.60*	3.01*	4.31*	5.76*
	10	1.31	1.45	1.79	1.97	2.15	2.33	2.70	2.90*	3.37*	4.88*	6.63*
	14	1.53	1.70	2.10	2.32	2.53	2.75	3.21	3.45*	4.04*	6.01*	8.50*
1000	8	1.21	1.34	1.66	1.82	1.98	2.15	2.48	2.66*	3.08*	4.41*	5.89*
	10	1.34	1.48	1.83	2.01	2.20	2.38	2.76	2.97*	3.44*	4.99*	6.78*
	14	1.57	1.74	2.15	2.37	2.59	2.82	3.28	3.54*	4.13*	6.16*	8.69*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 m (RADIUS = 2.8 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
		(m*s) ^{1/2}										
50	8	0.75	0.84	1.04	1.15	1.27	1.38	1.63	1.76*	2.08*	3.64*	8.88*
	10	0.80	0.89	1.11	1.24	1.36	1.50	1.79	1.95*	2.37*	5.52*	15.72*
	14	0.88	0.99	1.25	1.40	1.56	1.74	2.17	2.46*	3.39*	12.69*	40.17*
100	8	0.90	1.00	1.25	1.38	1.52	1.66	1.95	2.12*	2.50*	4.12*	8.88*
	10	0.97	1.08	1.36	1.50	1.66	1.82	2.17	2.37*	2.85*	5.65*	15.72*
	14	1.09	1.22	1.56	1.74	1.94	2.15	2.64	2.96*	3.84*	12.69*	40.17*
150	8	1.02	1.14	1.42	1.57	1.72	1.88	2.22	2.40*	2.83*	4.58*	8.93*
	10	1.11	1.24	1.55	1.72	1.90	2.08	2.47	2.70*	3.24*	5.98*	15.72*
	14	1.26	1.42	1.80	2.01	2.23	2.48	3.03	3.37*	4.28*	12.69*	40.17*
200	8	1.13	1.26	1.57	1.73	1.90	2.08	2.44	2.64*	3.12*	4.99*	9.10*
	10	1.23	1.37	1.72	1.91	2.10	2.30	2.74	2.98*	3.58*	6.37*	15.72*
	14	1.41	1.58	2.01	2.24	2.49	2.76	3.36	3.73*	4.69*	12.70*	40.17*
250	8	1.23	1.36	1.70	1.88	2.06	2.25	2.65	2.86*	3.38*	5.37*	9.35*
	10	1.34	1.49	1.87	2.08	2.29	2.51	2.97	3.24*	3.88*	6.76*	15.73*
	14	1.55	1.74	2.20	2.45	2.72	3.01	3.66	4.05*	5.06*	12.73*	40.17*
300	8	1.31	1.46	1.82	2.01	2.21	2.41	2.83	3.07*	3.62*	5.72*	9.66*
	10	1.44	1.61	2.01	2.23	2.46	2.69	3.19	3.48*	4.16*	7.13*	15.75*
	14	1.67	1.87	2.37	2.65	2.94	3.25	3.94	4.35*	5.41*	12.81*	40.17*
350	8	1.39	1.55	1.93	2.14	2.35	2.56	3.01	3.26*	3.84*	6.05*	9.98*
	10	1.53	1.71	2.14	2.38	2.62	2.87	3.40	3.69*	4.42*	7.49*	15.80*
	14	1.79	2.00	2.54	2.83	3.14	3.46	4.19	4.62*	5.73*	12.94*	40.17*
400	8	1.47	1.64	2.04	2.26	2.48	2.70	3.17	3.43*	4.05*	6.36*	10.32*
	10	1.62	1.81	2.27	2.51	2.77	3.03	3.59	3.90*	4.66*	7.84*	15.89*
	14	1.90	2.13	2.69	3.00	3.32	3.67	4.43	4.88*	6.04*	13.12*	40.17*
450	8	1.55	1.72	2.14	2.37	2.60	2.83	3.33	3.60*	4.25*	6.65*	10.65*
	10	1.71	1.90	2.38	2.64	2.91	3.18	3.77	4.10*	4.89*	8.17*	16.02*
	14	2.00	2.24	2.83	3.16	3.50	3.86	4.66	5.13*	6.33*	13.34*	40.17*
500	8	1.62	1.80	2.24	2.47	2.72	2.96	3.48	3.76*	4.44*	6.93*	10.99*
	10	1.79	1.99	2.50	2.76	3.04	3.33	3.94	4.28*	5.12*	8.49*	16.19*
	14	2.10	2.35	2.97	3.31	3.67	4.05	4.88	5.37*	6.60*	13.58*	40.17*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 m (RADIUS = 2.8 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	1.68	1.87	2.33	2.58	2.83	3.08	3.62	3.92*	4.62*	7.20*	11.31*
	10	1.87	2.08	2.60	2.88	3.17	3.47	4.11	4.46*	5.33*	8.80*	16.38*
	14	2.20	2.46	3.11	3.46	3.83	4.23	5.09	5.59*	6.87*	13.83*	40.17*
600	8	1.75	1.95	2.42	2.68	2.94	3.20	3.76	4.06*	4.79*	7.46*	11.63*
	10	1.94	2.16	2.71	3.00	3.30	3.61	4.27	4.64*	5.53*	9.09*	16.60*
	14	2.29	2.56	3.24	3.60	3.99	4.40	5.29	5.81*	7.13*	14.10*	40.17*
650	8	1.81	2.02	2.51	2.77	3.04	3.32	3.89	4.21*	4.96*	7.71*	11.95*
	10	2.01	2.25	2.81	3.11	3.42	3.74	4.42	4.80*	5.73*	9.38*	16.83*
	14	2.38	2.66	3.36	3.74	4.14	4.56	5.48	6.02*	7.38*	14.38*	40.17*
700	8	1.87	2.08	2.59	2.87	3.14	3.43	4.02	4.35*	5.13*	7.95*	12.25*
	10	2.08	2.32	2.90	3.22	3.54	3.87	4.57	4.96*	5.92*	9.66*	17.08*
	14	2.46	2.76	3.48	3.87	4.29	4.72	5.67	6.23*	7.62*	14.66*	40.17*
750	8	1.93	2.15	2.68	2.96	3.24	3.53	4.14	4.48*	5.28*	8.19*	12.55*
	10	2.15	2.40	3.00	3.32	3.65	3.99	4.71	5.12*	6.10*	9.93*	17.33*
	14	2.55	2.85	3.60	4.00	4.43	4.88	5.85	6.42*	7.85*	14.94*	40.17*
800	8	1.99	2.21	2.76	3.04	3.34	3.64	4.26	4.61*	5.44*	8.42*	12.85*
	10	2.22	2.47	3.09	3.42	3.76	4.11	4.86	5.27*	6.28*	10.20*	17.59*
	14	2.63	2.94	3.71	4.13	4.57	5.03	6.03	6.62*	8.07*	15.22*	40.17*
850	8	2.05	2.28	2.83	3.13	3.43	3.74	4.38	4.74*	5.59*	8.64*	13.14*
	10	2.28	2.54	3.18	3.52	3.87	4.23	4.99	5.42*	6.46*	10.45*	17.86*
	14	2.71	3.03	3.82	4.25	4.70	5.17	6.20	6.80*	8.30*	15.49*	40.17*
900	8	2.10	2.34	2.91	3.21	3.52	3.84	4.50	4.86*	5.74*	8.86*	13.42*
	10	2.35	2.62	3.27	3.61	3.97	4.35	5.13	5.57*	6.63*	10.71*	18.12*
	14	2.79	3.12	3.93	4.37	4.83	5.32	6.37	6.98*	8.51*	15.77*	40.18*
950	8	2.16	2.40	2.98	3.29	3.61	3.94	4.61	4.99*	5.88*	9.07*	13.70*
	10	2.41	2.68	3.35	3.71	4.08	4.46	5.26	5.71*	6.79*	10.95*	18.39*
	14	2.86	3.20	4.04	4.49	4.96	5.46	6.54	7.16*	8.72*	16.05*	40.18*
1000	8	2.21	2.46	3.06	3.37	3.70	4.03	4.72	5.10*	6.02*	9.28*	13.97*
	10	2.47	2.75	3.44	3.80	4.18	4.57	5.39	5.85*	6.96*	11.19*	18.66*
	14	2.94	3.29	4.14	4.60	5.09	5.60	6.70	7.34*	8.93*	16.32*	40.19*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 m (RADIUS = 2.8 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	1.22	1.37	1.78	2.02	2.29	2.62	3.65	4.62*	8.01*	35.56*	117.08*
	10	1.32	1.50	1.98	2.29	2.68	3.22	5.58	7.72*	14.29*	67.70*	226.53*
	14	1.51	1.75	2.46	3.05	4.07	6.02	13.20	18.95*	36.73*	182.55*	617.68*
100	8	1.53	1.72	2.22	2.51	2.84	3.21	4.22	5.02*	8.04*	35.56*	117.08*
	10	1.67	1.90	2.50	2.87	3.31	3.86	5.80	7.74*	14.29*	67.70*	226.53*
	14	1.95	2.25	3.11	3.73	4.63	6.19	13.20	18.95*	36.73*	182.55*	617.68*
150	8	1.77	2.00	2.58	2.91	3.28	3.69	4.76	5.52*	8.21*	35.56*	117.08*
	10	1.96	2.22	2.92	3.33	3.82	4.40	6.23	7.92*	14.29*	67.70*	226.53*
	14	2.30	2.66	3.63	4.30	5.21	6.61	13.21	18.95*	36.73*	182.55*	617.68*
200	8	1.99	2.24	2.88	3.25	3.65	4.11	5.23	6.01*	8.53*	35.56*	117.08*
	10	2.21	2.50	3.27	3.73	4.26	4.88	6.70	8.25*	14.30*	67.70*	226.53*
	14	2.61	3.01	4.09	4.81	5.74	7.09	13.22	18.95*	36.73*	182.55*	617.68*
250	8	2.18	2.46	3.16	3.56	4.00	4.48	5.66	6.46*	8.91*	35.56*	117.08*
	10	2.43	2.76	3.60	4.09	4.66	5.32	7.16	8.63*	14.35*	67.70*	226.53*
	14	2.89	3.32	4.49	5.26	6.23	7.56	13.29	18.95*	36.73*	182.55*	617.68*
300	8	2.36	2.66	3.42	3.84	4.31	4.82	6.06	6.88*	9.32*	35.56*	117.08*
	10	2.63	2.99	3.89	4.42	5.02	5.72	7.59	9.04*	14.45*	67.70*	226.53*
	14	3.14	3.61	4.87	5.67	6.68	8.03	13.43	18.96*	36.73*	182.55*	617.68*
350	8	2.53	2.85	3.65	4.11	4.60	5.14	6.44	7.28*	9.72*	35.56*	117.08*
	10	2.83	3.20	4.17	4.73	5.36	6.09	8.01	9.44*	14.61*	67.70*	226.53*
	14	3.38	3.88	5.21	6.06	7.10	8.47	13.64	18.99*	36.73*	182.55*	617.68*
400	8	2.68	3.03	3.88	4.36	4.87	5.44	6.79	7.66*	10.13*	35.56*	117.08*
	10	3.01	3.41	4.43	5.02	5.68	6.44	8.41	9.84*	14.82*	67.70*	226.53*
	14	3.60	4.14	5.54	6.43	7.50	8.89	13.90	19.04*	36.73*	182.55*	617.68*
450	8	2.83	3.19	4.09	4.59	5.13	5.73	7.13	8.02*	10.52*	35.56*	117.08*
	10	3.18	3.60	4.67	5.29	5.99	6.77	8.79	10.23*	15.08*	67.70*	226.53*
	14	3.82	4.38	5.85	6.77	7.88	9.29	14.19	19.13*	36.73*	182.55*	617.68*
500	8	2.98	3.35	4.29	4.82	5.38	6.00	7.45	8.36*	10.90*	35.56*	117.08*
	10	3.34	3.79	4.91	5.56	6.28	7.09	9.16	10.60*	15.37*	67.70*	226.53*
	14	4.02	4.61	6.15	7.10	8.25	9.68	14.50	19.25*	36.73*	182.55*	617.68*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 m (RADIUS = 2.8 m)³
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	3.11	3.51	4.48	5.03	5.62	6.26	7.75	8.69*	11.27*	35.57*	117.08*	
	10	3.50	3.97	5.13	5.81	6.55	7.39	9.51	10.97*	15.67*	67.70*	226.53*	
	14	4.22	4.83	6.43	7.42	8.60	10.06	14.82	19.41*	36.73*	182.55*	617.68*	
600	8	3.25	3.66	4.67	5.24	5.85	6.51	8.05	9.01*	11.63*	35.57*	117.08*	
	10	3.65	4.14	5.35	6.05	6.82	7.69	9.85	11.33*	15.98*	67.70*	226.53*	
	14	4.40	5.04	6.70	7.73	8.93	10.42	15.15	19.60*	36.74*	182.55*	617.68*	
650	8	3.38	3.80	4.85	5.44	6.07	6.75	8.34	9.32*	11.98*	35.58*	117.08*	
	10	3.80	4.30	5.56	6.28	7.08	7.97	10.18	11.67*	16.31*	67.70*	226.53*	
	14	4.59	5.25	6.97	8.02	9.26	10.77	15.49	19.82*	36.74*	182.55*	617.68*	
700	8	3.50	3.94	5.03	5.63	6.28	6.99	8.61	9.61*	12.32*	35.59*	117.08*	
	10	3.94	4.46	5.76	6.51	7.33	8.24	10.50	12.01*	16.63*	67.70*	226.53*	
	14	4.76	5.45	7.22	8.31	9.57	11.11	15.82	20.05*	36.75*	182.55*	617.68*	
750	8	3.62	4.07	5.20	5.82	6.49	7.22	8.88	9.90*	12.65*	35.61*	117.08*	
	10	4.08	4.62	5.96	6.73	7.57	8.51	10.81	12.34*	16.96*	67.70*	226.53*	
	14	4.93	5.64	7.47	8.58	9.88	11.45	16.16	20.30*	36.76*	182.55*	617.68*	
800	8	3.74	4.21	5.36	6.01	6.69	7.44	9.14	10.18*	12.97*	35.64*	117.08*	
	10	4.22	4.77	6.15	6.94	7.81	8.77	11.11	12.66*	17.28*	67.70*	226.53*	
	14	5.10	5.83	7.71	8.85	10.18	11.77	16.49	20.57*	36.77*	182.55*	617.68*	
850	8	3.85	4.33	5.52	6.18	6.89	7.65	9.39	10.46*	13.29*	35.68*	117.08*	
	10	4.35	4.92	6.34	7.15	8.04	9.02	11.40	12.97*	17.61*	67.70*	226.53*	
	14	5.26	6.01	7.95	9.11	10.46	12.08	16.82	20.84*	36.80*	182.55*	617.68*	
900	8	3.96	4.46	5.68	6.36	7.08	7.86	9.64	10.73*	13.60*	35.73*	117.08*	
	10	4.48	5.06	6.52	7.35	8.26	9.26	11.69	13.28*	17.93*	67.70*	226.53*	
	14	5.42	6.19	8.17	9.37	10.75	12.39	17.15	21.12*	36.83*	182.55*	617.68*	
950	8	4.07	4.58	5.83	6.53	7.27	8.07	9.88	10.99*	13.90*	35.80*	117.08*	
	10	4.60	5.20	6.70	7.55	8.48	9.50	11.97	13.58*	18.25*	67.70*	226.53*	
	14	5.58	6.37	8.40	9.62	11.02	12.69	17.47	21.40*	36.87*	182.55*	617.68*	
1000	8	4.18	4.70	5.98	6.69	7.45	8.27	10.12	11.24*	14.20*	35.88*	117.08*	
	10	4.72	5.34	6.87	7.74	8.69	9.74	12.25	13.87*	18.57*	67.70*	226.53*	
	14	5.73	6.54	8.62	9.86	11.29	12.99	17.79	21.69*	36.92*	182.55*	617.68*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 m (RADIUS = 2.8 m)
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	2.14	2.55	4.12	6.22	10.18	16.22	37.41	54.44*	107.29*	541.90*	1840.3*
	10	2.40	2.96	6.18	10.96	18.65	30.35	71.56	104.72*	207.76*	1056.1*	3591.5*
	14	2.95	4.07	14.98	28.02	48.95	80.86	193.58	284.40*	566.82*	2893.6*	9849.8*
100	8	2.79	3.29	4.97	6.67	10.20	16.22	37.41	54.44*	107.29*	541.90*	1840.3*
	10	3.15	3.82	6.70	10.98	18.65	30.35	71.56	104.72*	207.76*	1056.1*	3591.5*
	14	3.89	5.10	14.98	28.02	48.95	80.86	193.58	284.40*	566.82*	2893.6*	9849.8*
150	8	3.30	3.89	5.72	7.33	10.39	16.22	37.41	54.44*	107.29*	541.90*	1840.3*
	10	3.75	4.52	7.41	11.13	18.66	30.35	71.56	104.72*	207.76*	1056.1*	3591.5*
	14	4.65	5.96	15.00	28.02	48.95	80.86	193.58	284.40*	566.82*	2893.6*	9849.8*
200	8	3.75	4.40	6.37	7.99	10.78	16.25	37.41	54.44*	107.29*	541.90*	1840.3*
	10	4.27	5.12	8.11	11.49	18.66	30.35	71.56	104.72*	207.76*	1056.1*	3591.5*
	14	5.30	6.71	15.12	28.02	48.95	80.86	193.58	284.40*	566.82*	2893.6*	9849.8*
250	8	4.15	4.86	6.96	8.61	11.26	16.34	37.41	54.44*	107.29*	541.90*	1840.3*
	10	4.74	5.66	8.76	11.96	18.71	30.35	71.56	104.72*	207.76*	1056.1*	3591.5*
	14	5.89	7.39	15.37	28.02	48.95	80.86	193.58	284.40*	566.82*	2893.6*	9849.8*
300	8	4.52	5.29	7.51	9.19	11.78	16.52	37.41	54.44*	107.29*	541.90*	1840.3*
	10	5.16	6.15	9.38	12.48	18.81	30.35	71.56	104.72*	207.76*	1056.1*	3591.5*
	14	6.43	8.01	15.74	28.02	48.95	80.86	193.58	284.40*	566.82*	2893.6*	9849.8*
350	8	4.87	5.68	8.02	9.74	12.30	16.79	37.41	54.44*	107.29*	541.90*	1840.3*
	10	5.57	6.61	9.96	13.02	19.00	30.35	71.56	104.72*	207.76*	1056.1*	3591.5*
	14	6.93	8.59	16.19	28.04	48.95	80.86	193.58	284.40*	566.82*	2893.6*	9849.8*
400	8	5.19	6.05	8.50	10.27	12.82	17.12	37.41	54.44*	107.29*	541.90*	1840.3*
	10	5.94	7.04	10.50	13.55	19.25	30.36	71.56	104.72*	207.76*	1056.1*	3591.5*
	14	7.40	9.14	16.67	28.07	48.95	80.86	193.58	284.40*	566.82*	2893.6*	9849.8*
450	8	5.50	6.41	8.95	10.77	13.32	17.49	37.41	54.44*	107.29*	541.90*	1840.3*
	10	6.30	7.46	11.03	14.08	19.56	30.38	71.56	104.72*	207.76*	1056.1*	3591.5*
	14	7.85	9.66	17.17	28.14	48.95	80.86	193.58	284.40*	566.82*	2893.6*	9849.8*
500	8	5.80	6.74	9.39	11.25	13.82	17.88	37.42	54.44*	107.29*	541.90*	1840.3*
	10	6.64	7.85	11.53	14.59	19.91	30.42	71.56	104.72*	207.76*	1056.1*	3591.5*
	14	8.28	10.15	17.69	28.24	48.95	80.86	193.58	284.40*	566.82*	2893.6*	9849.8*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 m (RADIUS = 2.8 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE RATE
TIME INDEX OF RISE

CEILING HEIGHT, m

(m*s)^{1/2} °C/min

	1	2	4	5	6	7	9	10	12	18	24
550	6.08 6.97 8.69	7.07 8.22 10.63	9.81 12.01 18.20	11.71 15.09 28.39	14.30 20.29 48.95	18.29 30.48 80.86	37.42 71.56 193.58	54.44* 104.72* 284.40*	107.29* 207.76* 566.82*	541.90* 1056.1* 2893.6*	1840.3* 3591.5* 9849.8*
600	6.35 7.29 9.08	7.38 8.59 11.08	10.21 12.48 18.71	12.15 15.58 28.58	14.77 20.68 48.95	18.71 30.57 80.86	37.44 71.56 193.58	54.44* 104.72* 284.40*	107.29* 207.76* 566.82*	541.90* 1056.1* 2893.6*	1840.3* 3591.5* 9849.8*
650	6.62 7.59 9.46	7.68 8.94 11.52	10.60 12.93 19.21	12.58 16.06 28.80	15.23 21.09 48.95	19.13 30.69 80.86	37.46 71.56 193.58	54.44* 104.72* 284.40*	107.29* 207.76* 566.82*	541.90* 1056.1* 2893.6*	1840.3* 3591.5* 9849.8*
700	6.87 7.89 9.83	7.97 9.27 11.95	10.97 13.36 19.70	13.00 16.53 29.06	15.67 21.51 48.96	19.56 30.84 80.86	37.49 71.56 193.58	54.44* 104.72* 284.40*	107.29* 207.76* 566.82*	541.90* 1056.1* 2893.6*	1840.3* 3591.5* 9849.8*
750	7.12 8.17 10.19	8.25 9.60 12.36	11.33 13.79 20.19	13.40 16.98 29.35	16.10 21.92 48.97	19.98 31.02 80.86	37.54 71.56 193.58	54.44* 104.72* 284.40*	107.29* 207.76* 566.82*	541.90* 1056.1* 2893.6*	1840.3* 3591.5* 9849.8*
800	7.36 8.45 10.54	8.53 9.92 12.77	11.69 14.20 20.67	13.80 17.43 29.66	16.53 22.34 48.98	20.39 31.22 80.86	37.60 71.56 193.58	54.44* 104.72* 284.40*	107.29* 207.76* 566.82*	541.90* 1056.1* 2893.6*	1840.3* 3591.5* 9849.8*
850	7.60 8.72 10.88	8.79 10.23 13.16	12.03 14.60 21.15	14.18 17.86 29.99	16.94 22.76 49.01	20.81 31.45 80.86	37.68 71.56 193.58	54.44* 104.72* 284.40*	107.29* 207.76* 566.82*	541.90* 1056.1* 2893.6*	1840.3* 3591.5* 9849.8*
900	7.83 8.99 11.21	9.05 10.54 13.54	12.37 14.99 21.61	14.56 18.29 30.33	17.35 23.18 49.04	21.22 31.70 80.86	37.78 71.56 193.58	54.45* 104.72* 284.40*	107.29* 207.76* 566.82*	541.90* 1056.1* 2893.6*	1840.3* 3591.5* 9849.8*
950	8.05 9.25 11.54	9.31 10.83 13.91	12.70 15.37 22.07	14.92 18.71 30.69	17.75 23.59 49.08	21.62 31.96 80.86	37.89 71.56 193.58	54.46* 104.72* 284.40*	107.29* 207.76* 566.82*	541.90* 1056.1* 2893.6*	1840.3* 3591.5* 9849.8*
1000	8.27 9.50 11.85	9.56 11.12 14.28	13.02 15.75 22.52	15.28 19.12 31.05	18.14 24.00 49.13	22.02 32.25 80.86	38.03 71.56 193.58	54.47* 104.72* 284.40*	107.29* 207.76* 566.82*	541.90* 1056.1* 2893.6*	1840.3* 3591.5* 9849.8*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.5 m (RADIUS = 3.2 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	0.54	0.59	0.71	0.78	0.85	0.91	1.05	1.11	1.26*	1.73*	2.29*
	10	0.57	0.62	0.75	0.82	0.89	0.96	1.10	1.18	1.33*	1.88*	2.61*
	14	0.61	0.67	0.81	0.89	0.97	1.05	1.22	1.30	1.50*	2.26*	3.94*
100	8	0.63	0.68	0.82	0.90	0.98	1.05	1.21	1.29	1.46*	2.03*	2.68*
	10	0.66	0.72	0.88	0.96	1.04	1.12	1.29	1.38	1.57*	2.23*	3.06*
	14	0.73	0.80	0.97	1.06	1.16	1.25	1.45	1.56	1.79*	2.68*	4.22*
150	8	0.69	0.76	0.91	1.00	1.08	1.17	1.34	1.43	1.62*	2.26*	3.00*
	10	0.74	0.81	0.98	1.07	1.16	1.26	1.45	1.54	1.76*	2.50*	3.42*
	14	0.82	0.90	1.10	1.20	1.31	1.42	1.65	1.76	2.03*	3.03*	4.59*
200	8	0.75	0.82	0.99	1.08	1.18	1.27	1.46	1.55	1.76*	2.47*	3.27*
	10	0.81	0.88	1.07	1.17	1.27	1.37	1.58	1.69	1.92*	2.74*	3.74*
	14	0.91	0.99	1.21	1.32	1.44	1.56	1.81	1.94	2.23*	3.33*	4.95*
250	8	0.81	0.88	1.06	1.16	1.26	1.36	1.56	1.66	1.89*	2.65*	3.52*
	10	0.87	0.95	1.15	1.26	1.37	1.48	1.70	1.81	2.07*	2.95*	4.03*
	14	0.98	1.07	1.31	1.43	1.56	1.69	1.96	2.10	2.42*	3.60*	5.29*
300	8	0.86	0.93	1.13	1.23	1.34	1.44	1.66	1.76	2.00*	2.82*	3.75*
	10	0.93	1.01	1.22	1.34	1.45	1.57	1.81	1.93	2.20*	3.15*	4.29*
	14	1.05	1.15	1.40	1.53	1.67	1.81	2.10	2.25	2.58*	3.85*	5.61*
350	8	0.90	0.98	1.19	1.30	1.41	1.52	1.75	1.86	2.11*	2.98*	3.96*
	10	0.98	1.07	1.29	1.41	1.54	1.66	1.91	2.04	2.33*	3.33*	4.54*
	14	1.12	1.22	1.49	1.63	1.77	1.92	2.23	2.38	2.74*	4.08*	5.91*
400	8	0.95	1.03	1.25	1.36	1.48	1.59	1.83	1.95	2.21*	3.13*	4.16*
	10	1.03	1.12	1.36	1.49	1.61	1.74	2.01	2.14	2.45*	3.51*	4.77*
	14	1.18	1.29	1.57	1.72	1.87	2.03	2.35	2.51	2.89*	4.30*	6.20*
450	8	0.99	1.07	1.30	1.42	1.54	1.66	1.91	2.03	2.31*	3.27*	4.34*
	10	1.08	1.17	1.42	1.55	1.69	1.82	2.10	2.24	2.56*	3.67*	4.99*
	14	1.23	1.35	1.64	1.80	1.96	2.12	2.46	2.63	3.03*	4.50*	6.47*
500	8	1.03	1.12	1.35	1.48	1.60	1.73	1.99	2.12	2.40*	3.40*	4.52*
	10	1.12	1.22	1.48	1.62	1.76	1.90	2.19	2.34	2.67*	3.83*	5.20*
	14	1.29	1.41	1.72	1.88	2.05	2.22	2.57	2.75	3.17*	4.70*	6.74*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.5 m (RADIUS = 3.2 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		(m*s) ^{1/2}										
		1	2	4	5	6	7	9	10	12	18	24
550	8	1.06	1.16	1.40	1.53	1.66	1.79	2.06	2.19	2.49*	3.53*	4.70*
	10	1.16	1.27	1.54	1.68	1.83	1.97	2.27	2.42	2.77*	3.98*	5.40*
	14	1.34	1.47	1.79	1.96	2.13	2.31	2.67	2.86	3.29*	4.89*	6.99*
600	8	1.10	1.20	1.45	1.58	1.72	1.85	2.13	2.27	2.58*	3.65*	4.86*
	10	1.21	1.32	1.60	1.74	1.89	2.04	2.35	2.51	2.87*	4.12*	5.59*
	14	1.39	1.53	1.86	2.03	2.21	2.40	2.78	2.97	3.42*	5.07*	7.23*
650	8	1.14	1.24	1.50	1.63	1.77	1.91	2.20	2.34	2.66*	3.77*	5.02*
	10	1.25	1.36	1.65	1.80	1.96	2.11	2.43	2.60	2.96*	4.26*	5.78*
	14	1.44	1.58	1.92	2.11	2.29	2.48	2.87	3.07	3.54*	5.24*	7.46*
700	8	1.17	1.28	1.54	1.68	1.83	1.97	2.26	2.41	2.74*	3.89*	5.18*
	10	1.29	1.40	1.70	1.86	2.02	2.18	2.51	2.68	3.06*	4.39*	5.96*
	14	1.49	1.63	1.99	2.18	2.37	2.56	2.97	3.18	3.65*	5.41*	7.69*
750	8	1.20	1.31	1.59	1.73	1.88	2.03	2.33	2.48	2.82*	4.00*	5.33*
	10	1.32	1.44	1.75	1.91	2.08	2.24	2.58	2.75	3.15*	4.53*	6.13*
	14	1.54	1.68	2.05	2.24	2.44	2.64	3.06	3.27	3.77*	5.58*	7.91*
800	8	1.24	1.35	1.63	1.78	1.93	2.08	2.39	2.55	2.90*	4.11*	5.47*
	10	1.36	1.49	1.80	1.97	2.14	2.31	2.65	2.83	3.23*	4.65*	6.30*
	14	1.58	1.73	2.11	2.31	2.51	2.72	3.15	3.37	3.88*	5.74*	8.12*
850	8	1.27	1.38	1.67	1.82	1.98	2.13	2.45	2.61	2.97*	4.22*	5.61*
	10	1.40	1.52	1.85	2.02	2.19	2.37	2.72	2.91	3.32*	4.78*	6.47*
	14	1.63	1.78	2.17	2.37	2.58	2.80	3.24	3.46	3.98*	5.90*	8.33*
900	8	1.30	1.42	1.71	1.87	2.03	2.19	2.51	2.67	3.04*	4.32*	5.75*
	10	1.43	1.56	1.89	2.07	2.25	2.43	2.79	2.98	3.40*	4.90*	6.63*
	14	1.67	1.83	2.23	2.44	2.65	2.87	3.32	3.55	4.09*	6.05*	8.54*
950	8	1.33	1.45	1.75	1.91	2.07	2.24	2.57	2.74	3.11*	4.42*	5.89*
	10	1.47	1.60	1.94	2.12	2.30	2.49	2.86	3.05	3.48*	5.01*	6.79*
	14	1.71	1.88	2.28	2.50	2.72	2.94	3.40	3.64	4.19*	6.20*	8.74*
1000	8	1.36	1.48	1.79	1.95	2.12	2.29	2.62	2.80	3.18*	4.52*	6.02*
	10	1.50	1.64	1.98	2.17	2.35	2.54	2.93	3.12	3.56*	5.13*	6.94*
	14	1.76	1.92	2.34	2.56	2.78	3.01	3.48	3.73	4.29*	6.34*	8.93*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.5 m (RADIUS = 3.2 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE RATE
 TIME INDEX OF RISE

CEILING HEIGHT, m

(m*s) ^{1/2}	°C/min	1	2	4	5	6	7	9	10	12	18	24
50	8	0.83	0.91	1.12	1.23	1.34	1.46	1.71	1.85	2.16*	3.86*	9.51*
	10	0.89	0.97	1.20	1.32	1.45	1.59	1.89	2.06	2.49*	5.98*	16.93*
	14	0.98	1.08	1.35	1.51	1.67	1.86	2.32	2.64	3.70*	13.93*	43.44*
100	8	1.00	1.10	1.35	1.48	1.62	1.76	2.06	2.22	2.59*	4.31*	9.51*
	10	1.08	1.19	1.46	1.61	1.77	1.94	2.30	2.49	2.98*	6.07*	16.93*
	14	1.22	1.35	1.68	1.87	2.08	2.30	2.83	3.15	4.10*	13.93*	43.44*
150	8	1.14	1.25	1.53	1.68	1.84	2.00	2.34	2.52	2.94*	4.77*	9.54*
	10	1.24	1.36	1.67	1.85	2.03	2.22	2.62	2.84	3.38*	6.35*	16.93*
	14	1.41	1.56	1.95	2.17	2.40	2.65	3.24	3.59	4.54*	13.93*	43.44*
200	8	1.26	1.38	1.69	1.86	2.03	2.21	2.58	2.78	3.24*	5.19*	9.66*
	10	1.37	1.51	1.86	2.05	2.25	2.46	2.90	3.15	3.73*	6.72*	16.93*
	14	1.58	1.75	2.18	2.42	2.68	2.96	3.59	3.97	4.96*	13.94*	43.44*
250	8	1.37	1.50	1.84	2.02	2.20	2.40	2.80	3.02	3.51*	5.57*	9.88*
	10	1.50	1.65	2.03	2.23	2.45	2.68	3.16	3.42	4.05*	7.10*	16.93*
	14	1.73	1.92	2.39	2.65	2.93	3.23	3.91	4.31	5.34*	13.95*	43.44*
300	8	1.47	1.61	1.97	2.16	2.36	2.57	3.00	3.23	3.76*	5.93*	10.16*
	10	1.61	1.77	2.18	2.40	2.63	2.88	3.39	3.67	4.34*	7.48*	16.94*
	14	1.88	2.07	2.58	2.86	3.16	3.48	4.21	4.62	5.70*	14.00*	43.44*
350	8	1.56	1.71	2.09	2.30	2.51	2.73	3.19	3.43	3.99*	6.27*	10.47*
	10	1.72	1.89	2.32	2.56	2.81	3.06	3.61	3.90	4.61*	7.84*	16.97*
	14	2.01	2.22	2.76	3.06	3.38	3.72	4.48	4.92	6.03*	14.09*	43.44*
400	8	1.65	1.81	2.21	2.43	2.65	2.88	3.36	3.62	4.21*	6.59*	10.79*
	10	1.82	2.00	2.46	2.71	2.97	3.24	3.81	4.12	4.86*	8.19*	17.04*
	14	2.13	2.35	2.93	3.24	3.58	3.94	4.74	5.19	6.35*	14.22*	43.44*
450	8	1.73	1.90	2.32	2.55	2.78	3.03	3.53	3.80	4.42*	6.89*	11.12*
	10	1.91	2.10	2.59	2.85	3.12	3.40	4.01	4.33	5.10*	8.53*	17.13*
	14	2.25	2.48	3.09	3.42	3.77	4.15	4.98	5.46	6.65*	14.39*	43.44*
500	8	1.81	1.98	2.43	2.67	2.91	3.16	3.69	3.97	4.61*	7.18*	11.45*
	10	2.01	2.20	2.71	2.98	3.27	3.56	4.19	4.53	5.33*	8.85*	17.26*
	14	2.36	2.61	3.24	3.59	3.96	4.35	5.22	5.71	6.94*	14.60*	43.44*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.5 m (RADIUS = 3.2 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	1.89	2.07	2.53	2.78	3.03	3.29	3.84	4.13	4.80*	7.45*	11.77*
	10	2.09	2.30	2.83	3.11	3.41	3.72	4.37	4.72	5.55*	9.17*	17.42*
	14	2.47	2.73	3.39	3.75	4.13	4.54	5.44	5.95	7.21*	14.83*	43.44*
600	8	1.96	2.15	2.63	2.89	3.15	3.42	3.99	4.29	4.98*	7.72*	12.09*
	10	2.18	2.39	2.94	3.24	3.54	3.86	4.54	4.90	5.76*	9.47*	17.61*
	14	2.57	2.84	3.53	3.90	4.30	4.72	5.66	6.18	7.48*	15.07*	43.44*
650	8	2.03	2.23	2.72	2.99	3.26	3.54	4.13	4.44	5.16*	7.98*	12.41*
	10	2.26	2.48	3.05	3.36	3.68	4.01	4.71	5.08	5.97*	9.76*	17.82*
	14	2.67	2.95	3.66	4.05	4.47	4.90	5.86	6.40	7.74*	15.33*	43.44*
700	8	2.10	2.30	2.82	3.09	3.37	3.66	4.27	4.59	5.33*	8.23*	12.72*
	10	2.34	2.57	3.16	3.47	3.80	4.14	4.87	5.25	6.17*	10.05*	18.04*
	14	2.77	3.06	3.79	4.20	4.62	5.08	6.07	6.62	7.99*	15.59*	43.44*
750	8	2.17	2.38	2.90	3.19	3.48	3.78	4.40	4.73	5.49*	8.47*	13.02*
	10	2.41	2.66	3.26	3.59	3.93	4.28	5.02	5.42	6.36*	10.33*	18.28*
	14	2.86	3.16	3.92	4.34	4.78	5.24	6.26	6.83	8.23*	15.86*	43.44*
800	8	2.23	2.45	2.99	3.28	3.58	3.89	4.53	4.87	5.65*	8.70*	13.32*
	10	2.49	2.74	3.36	3.70	4.05	4.41	5.17	5.58	6.54*	10.60*	18.52*
	14	2.96	3.27	4.05	4.48	4.93	5.41	6.45	7.03	8.46*	16.13*	43.44*
850	8	2.30	2.52	3.08	3.38	3.68	4.00	4.66	5.00	5.81*	8.93*	13.61*
	10	2.56	2.82	3.46	3.80	4.16	4.53	5.32	5.74	6.73*	10.86*	18.78*
	14	3.05	3.37	4.17	4.61	5.07	5.56	6.64	7.23	8.69*	16.41*	43.44*
900	8	2.36	2.59	3.16	3.47	3.78	4.11	4.78	5.14	5.96*	9.16*	13.89*
	10	2.63	2.90	3.55	3.91	4.28	4.66	5.46	5.89	6.90*	11.12*	19.03*
	14	3.13	3.46	4.29	4.74	5.22	5.72	6.82	7.42	8.92*	16.68*	43.45*
950	8	2.42	2.65	3.24	3.56	3.88	4.21	4.90	5.26	6.11*	9.37*	14.18*
	10	2.70	2.97	3.65	4.01	4.39	4.78	5.60	6.04	7.08*	11.37*	19.29*
	14	3.22	3.56	4.40	4.87	5.35	5.87	6.99	7.61	9.13*	16.95*	43.45*
1000	8	2.48	2.72	3.32	3.64	3.97	4.31	5.02	5.39	6.25*	9.59*	14.45*
	10	2.77	3.05	3.74	4.11	4.50	4.90	5.74	6.19	7.25*	11.62*	19.55*
	14	3.30	3.65	4.52	4.99	5.49	6.02	7.16	7.80	9.35*	17.22*	43.45*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.5 m (RADIUS = 3.2 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	1.36	1.51	1.93	2.18	2.47	2.83	4.03	5.19	9.03*	39.23*	126.82*	
	10	1.47	1.65	2.16	2.50	2.94	3.58	6.42	8.85	16.24*	74.83*	245.52*	
	14	1.69	1.94	2.74	3.44	4.76	7.13	15.44	21.99	42.01*	202.05*	669.75*	
100	8	1.71	1.90	2.41	2.72	3.06	3.47	4.60	5.52	9.03*	39.23*	126.82*	
	10	1.87	2.10	2.73	3.13	3.61	4.23	6.55	8.86	16.24*	74.83*	245.52*	
	14	2.19	2.51	3.45	4.15	5.24	7.22	15.44	21.99	42.01*	202.05*	669.75*	
150	8	1.99	2.21	2.80	3.15	3.54	3.98	5.15	6.01	9.13*	39.23*	126.82*	
	10	2.20	2.47	3.19	3.63	4.16	4.81	6.93	8.96	16.24*	74.83*	245.52*	
	14	2.60	2.96	4.02	4.77	5.83	7.55	15.44	21.99	42.01*	202.05*	669.75*	
200	8	2.23	2.48	3.14	3.53	3.95	4.43	5.65	6.50	9.37*	39.23*	126.82*	
	10	2.48	2.78	3.58	4.07	4.64	5.32	7.39	9.22	16.24*	74.83*	245.52*	
	14	2.94	3.35	4.52	5.31	6.38	7.99	15.44	21.99	42.01*	202.05*	669.75*	
250	8	2.45	2.73	3.45	3.86	4.32	4.83	6.11	6.97	9.70*	39.23*	126.82*	
	10	2.73	3.06	3.94	4.46	5.07	5.78	7.85	9.56	16.26*	74.83*	245.52*	
	14	3.26	3.71	4.96	5.80	6.90	8.47	15.47	21.99	42.01*	202.05*	669.75*	
300	8	2.65	2.95	3.73	4.17	4.66	5.20	6.54	7.41	10.08*	39.23*	126.82*	
	10	2.96	3.32	4.26	4.82	5.46	6.21	8.31	9.95	16.30*	74.83*	245.52*	
	14	3.55	4.03	5.37	6.26	7.38	8.94	15.55	21.99	42.01*	202.05*	669.75*	
350	8	2.84	3.16	3.99	4.46	4.98	5.55	6.94	7.83	10.47*	39.23*	126.82*	
	10	3.18	3.56	4.56	5.16	5.83	6.61	8.74	10.35	16.40*	74.83*	245.52*	
	14	3.82	4.33	5.75	6.68	7.84	9.40	15.69	22.00	42.01*	202.05*	669.75*	
400	8	3.02	3.36	4.23	4.73	5.27	5.87	7.32	8.22	10.87*	39.23*	126.82*	
	10	3.39	3.79	4.85	5.47	6.18	6.99	9.16	10.75	16.54*	74.83*	245.52*	
	14	4.07	4.62	6.11	7.08	8.27	9.84	15.88	22.02	42.01*	202.05*	669.75*	
450	8	3.19	3.54	4.46	4.99	5.56	6.18	7.67	8.60	11.25*	39.23*	126.82*	
	10	3.58	4.01	5.12	5.77	6.51	7.35	9.56	11.15	16.73*	74.83*	245.52*	
	14	4.31	4.89	6.45	7.45	8.68	10.27	16.12	22.06	42.01*	202.05*	669.75*	
500	8	3.35	3.72	4.68	5.23	5.82	6.48	8.02	8.97	11.64*	39.23*	126.82*	
	10	3.77	4.22	5.38	6.06	6.82	7.69	9.95	11.53	16.96*	74.83*	245.52*	
	14	4.54	5.15	6.78	7.81	9.07	10.69	16.39	22.14	42.01*	202.05*	669.75*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.5 m (RADIUS = 3.2 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550 (m*s) ^{1/2}	8	3.50	3.90	4.90	5.47	6.08	6.76	8.34	9.31	12.01*	39.23*	126.82*	
	10	3.95	4.41	5.62	6.33	7.12	8.02	10.32	11.91	17.22*	74.83*	245.52*	
	14	4.77	5.40	7.09	8.16	9.45	11.09	16.69	22.24	42.01*	202.05*	669.75*	
600	8	3.65	4.06	5.10	5.69	6.33	7.03	8.66	9.65	12.38*	39.23*	126.82*	
	10	4.12	4.61	5.86	6.60	7.41	8.34	10.69	12.28	17.50*	74.83*	245.52*	
	14	4.98	5.63	7.39	8.49	9.81	11.47	17.00	22.37	42.01*	202.05*	669.75*	
650	8	3.80	4.22	5.30	5.91	6.57	7.29	8.97	9.98	12.73*	39.23*	126.82*	
	10	4.29	4.79	6.09	6.85	7.69	8.64	11.04	12.64	17.79*	74.83*	245.52*	
	14	5.19	5.87	7.68	8.81	10.17	11.85	17.33	22.53	42.01*	202.05*	669.75*	
700	8	3.94	4.38	5.49	6.12	6.80	7.54	9.26	10.29	13.08*	39.24*	126.82*	
	10	4.45	4.97	6.32	7.10	7.96	8.94	11.38	13.00	18.10*	74.83*	245.52*	
	14	5.39	6.09	7.96	9.12	10.51	12.21	17.65	22.71	42.01*	202.05*	669.75*	
750	8	4.08	4.53	5.68	6.33	7.03	7.79	9.55	10.60	13.42*	39.25*	126.82*	
	10	4.60	5.14	6.53	7.34	8.23	9.23	11.71	13.34	18.41*	74.83*	245.52*	
	14	5.58	6.30	8.23	9.43	10.84	12.57	17.99	22.92	42.02*	202.05*	669.75*	
800	8	4.21	4.67	5.86	6.53	7.25	8.03	9.83	10.90	13.76*	39.26*	126.82*	
	10	4.76	5.31	6.74	7.57	8.48	9.50	12.03	13.68	18.72*	74.83*	245.52*	
	14	5.77	6.52	8.50	9.72	11.16	12.92	18.32	23.14	42.02*	202.05*	669.75*	
850	8	4.34	4.82	6.04	6.72	7.46	8.26	10.10	11.19	14.08*	39.28*	126.82*	
	10	4.90	5.48	6.95	7.79	8.73	9.78	12.34	14.01	19.03*	74.83*	245.52*	
	14	5.95	6.72	8.75	10.00	11.47	13.25	18.66	23.38	42.03*	202.05*	669.75*	
900	8	4.46	4.96	6.21	6.91	7.67	8.49	10.36	11.47	14.40*	39.31*	126.82*	
	10	5.05	5.64	7.15	8.02	8.97	10.04	12.65	14.33	19.35*	74.83*	245.52*	
	14	6.13	6.92	9.01	10.28	11.78	13.58	18.99	23.63	42.04*	202.05*	669.75*	
950	8	4.59	5.09	6.38	7.10	7.87	8.71	10.62	11.75	14.71*	39.35*	126.82*	
	10	5.19	5.80	7.34	8.23	9.21	10.30	12.95	14.65	19.66*	74.83*	245.52*	
	14	6.31	7.12	9.25	10.56	12.08	13.91	19.32	23.90	42.06*	202.05*	669.75*	
1000	8	4.71	5.23	6.54	7.28	8.07	8.92	10.88	12.02	15.02*	39.39*	126.82*	
	10	5.33	5.95	7.53	8.44	9.44	10.55	13.24	14.96	19.98*	74.83*	245.52*	
	14	6.48	7.31	9.49	10.82	12.37	14.22	19.65	24.16	42.08*	202.05*	669.75*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.5 m (RADIUS = 3.2 m)
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C/min												
	8	2.42	2.86	4.80	7.58	12.35	19.48	44.02	63.45	122.99*	600.09*	1995.7*	
	10	2.73	3.37	7.72	13.61	22.85	36.68	84.42	122.27	238.38*	1169.7*	3895.0*	
	14	3.40	4.89	19.19	35.19	60.37	98.13	228.79	332.49	650.77*	3205.3*	10683.*	
100	8	3.15	3.70	5.65	7.85	12.36	19.48	44.02	63.45	122.99*	600.09*	1995.7*	
	10	3.58	4.34	8.03	13.61	22.85	36.68	84.42	122.27	238.38*	1169.7*	3895.0*	
	14	4.48	5.96	19.19	35.19	60.37	98.13	228.79	332.49	650.77*	3205.3*	10683.*	
150	8	3.74	4.36	6.44	8.44	12.44	19.48	44.02	63.45	122.99*	600.09*	1995.7*	
	10	4.26	5.12	8.66	13.66	22.85	36.68	84.42	122.27	238.38*	1169.7*	3895.0*	
	14	5.34	6.91	19.19	35.19	60.37	98.13	228.79	332.49	650.77*	3205.3*	10683.*	
200	8	4.25	4.94	7.15	9.09	12.69	19.49	44.02	63.45	122.99*	600.09*	1995.7*	
	10	4.85	5.79	9.36	13.86	22.85	36.68	84.42	122.27	238.38*	1169.7*	3895.0*	
	14	6.08	7.74	19.22	35.19	60.37	98.13	228.79	332.49	650.77*	3205.3*	10683.*	
250	8	4.70	5.46	7.80	9.74	13.08	19.52	44.02	63.45	122.99*	600.09*	1995.7*	
	10	5.38	6.39	10.04	14.21	22.86	36.68	84.42	122.27	238.38*	1169.7*	3895.0*	
	14	6.75	8.50	19.31	35.19	60.37	98.13	228.79	332.49	650.77*	3205.3*	10683.*	
300	8	5.12	5.93	8.39	10.35	13.55	19.61	44.02	63.45	122.99*	600.09*	1995.7*	
	10	5.87	6.95	10.69	14.65	22.90	36.68	84.42	122.27	238.38*	1169.7*	3895.0*	
	14	7.36	9.19	19.51	35.19	60.37	98.13	228.79	332.49	650.77*	3205.3*	10683.*	
350	8	5.52	6.38	8.95	10.94	14.05	19.77	44.02	63.45	122.99*	600.09*	1995.7*	
	10	6.33	7.46	11.31	15.14	22.98	36.68	84.42	122.27	238.38*	1169.7*	3895.0*	
	14	7.94	9.84	19.81	35.20	60.37	98.13	228.79	332.49	650.77*	3205.3*	10683.*	
400	8	5.89	6.79	9.48	11.50	14.56	20.00	44.02	63.45	122.99*	600.09*	1995.7*	
	10	6.76	7.95	11.90	15.66	23.12	36.68	84.42	122.27	238.38*	1169.7*	3895.0*	
	14	8.47	10.46	20.18	35.20	60.37	98.13	228.79	332.49	650.77*	3205.3*	10683.*	
450	8	6.24	7.19	9.98	12.04	15.08	20.30	44.02	63.45	122.99*	600.09*	1995.7*	
	10	7.16	8.41	12.47	16.18	23.32	36.68	84.42	122.27	238.38*	1169.7*	3895.0*	
	14	8.99	11.04	20.60	35.22	60.37	98.13	228.79	332.49	650.77*	3205.3*	10683.*	
500	8	6.57	7.57	10.46	12.56	15.58	20.63	44.02	63.45	122.99*	600.09*	1995.7*	
	10	7.55	8.85	13.01	16.71	23.57	36.69	84.42	122.27	238.38*	1169.7*	3895.0*	
	14	9.47	11.59	21.06	35.25	60.37	98.13	228.79	332.49	650.77*	3205.3*	10683.*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.5 m (RADIUS = 3.2 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	6.89	7.93	10.91	13.06	16.09	21.00	44.02	63.45	122.99*	600.09*	1995.7*	
	10	7.92	9.27	13.54	17.23	23.87	36.71	84.42	122.27	238.38*	1169.7*	3895.0*	
	14	9.94	12.13	21.54	35.30	60.37	98.13	228.79	332.49	650.77*	3205.3*	10683.*	
600	8	7.20	8.28	11.35	13.54	16.58	21.38	44.03	63.45	122.99*	600.09*	1995.7*	
	10	8.28	9.68	14.05	17.74	24.20	36.75	84.42	122.27	238.38*	1169.7*	3895.0*	
	14	10.39	12.64	22.03	35.38	60.37	98.13	228.79	332.49	650.77*	3205.3*	10683.*	
650	8	7.50	8.61	11.78	14.00	17.06	21.79	44.03	63.45	122.99*	600.09*	1995.7*	
	10	8.63	10.07	14.54	18.24	24.56	36.80	84.42	122.27	238.38*	1169.7*	3895.0*	
	14	10.82	13.13	22.53	35.49	60.37	98.13	228.79	332.49	650.77*	3205.3*	10683.*	
700	8	7.79	8.94	12.19	14.46	17.53	22.20	44.04	63.45	122.99*	600.09*	1995.7*	
	10	8.96	10.45	15.01	18.73	24.93	36.87	84.42	122.27	238.38*	1169.7*	3895.0*	
	14	11.24	13.61	23.02	35.63	60.37	98.13	228.79	332.49	650.77*	3205.3*	10683.*	
750	8	8.07	9.26	12.59	14.90	17.99	22.61	44.06	63.45	122.99*	600.09*	1995.7*	
	10	9.29	10.82	15.48	19.21	25.32	36.97	84.42	122.27	238.38*	1169.7*	3895.0*	
	14	11.65	14.08	23.52	35.80	60.38	98.13	228.79	332.49	650.77*	3205.3*	10683.*	
800	8	8.35	9.56	12.98	15.32	18.44	23.03	44.09	63.45	122.99*	600.09*	1995.7*	
	10	9.61	11.18	15.93	19.69	25.72	37.09	84.42	122.27	238.38*	1169.7*	3895.0*	
	14	12.05	14.53	24.01	36.01	60.38	98.13	228.79	332.49	650.77*	3205.3*	10683.*	
850	8	8.61	9.86	13.36	15.74	18.88	23.44	44.13	63.45	122.99*	600.09*	1995.7*	
	10	9.92	11.53	16.37	20.15	26.13	37.23	84.42	122.27	238.38*	1169.7*	3895.0*	
	14	12.44	14.97	24.50	36.24	60.38	98.13	228.79	332.49	650.77*	3205.3*	10683.*	
900	8	8.87	10.16	13.73	16.15	19.32	23.86	44.18	63.45	122.99*	600.09*	1995.7*	
	10	10.22	11.87	16.79	20.61	26.54	37.40	84.42	122.27	238.38*	1169.7*	3895.0*	
	14	12.81	15.40	24.99	36.49	60.39	98.13	228.79	332.49	650.77*	3205.3*	10683.*	
950	8	9.13	10.44	14.09	16.55	19.74	24.27	44.24	63.45	122.99*	600.09*	1995.7*	
	10	10.51	12.20	17.21	21.05	26.95	37.59	84.42	122.27	238.38*	1169.7*	3895.0*	
	14	13.18	15.82	25.47	36.77	60.40	98.13	228.79	332.49	650.77*	3205.3*	10683.*	
1000	8	9.38	10.72	14.44	16.94	20.16	24.69	44.32	63.46	122.99*	600.09*	1995.7*	
	10	10.80	12.52	17.62	21.49	27.36	37.80	84.42	122.27	238.38*	1169.7*	3895.0*	
	14	13.54	16.23	25.94	37.06	60.42	98.13	228.79	332.49	650.77*	3205.3*	10683.*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.0 m (RADIUS = 3.5 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
		(m*s) ^{1/2}										
50	8	0.59	0.64	0.76	0.82	0.89	0.95	1.09	1.16	1.29*	1.77*	2.34*
	10	0.62	0.67	0.79	0.86	0.93	1.01	1.15	1.22	1.38*	1.93*	2.69*
	14	0.67	0.72	0.86	0.94	1.02	1.10	1.27	1.36	1.55*	2.34*	4.16*
100	8	0.69	0.74	0.88	0.95	1.03	1.11	1.26	1.34	1.50*	2.07*	2.74*
	10	0.73	0.78	0.93	1.02	1.10	1.18	1.35	1.44	1.62*	2.28*	3.14*
	14	0.80	0.86	1.04	1.13	1.23	1.32	1.53	1.63	1.85*	2.77*	4.40*
150	8	0.76	0.82	0.98	1.06	1.14	1.23	1.40	1.49	1.67*	2.32*	3.07*
	10	0.82	0.88	1.05	1.14	1.23	1.32	1.52	1.61	1.81*	2.57*	3.51*
	14	0.91	0.98	1.17	1.28	1.39	1.50	1.73	1.85	2.10*	3.12*	4.76*
200	8	0.83	0.89	1.06	1.15	1.24	1.34	1.53	1.62	1.82*	2.53*	3.35*
	10	0.89	0.96	1.14	1.24	1.34	1.45	1.66	1.76	1.98*	2.81*	3.83*
	14	1.00	1.08	1.30	1.41	1.53	1.65	1.91	2.04	2.31*	3.43*	5.12*
250	8	0.89	0.95	1.14	1.23	1.33	1.43	1.64	1.74	1.95*	2.72*	3.60*
	10	0.96	1.03	1.23	1.34	1.45	1.56	1.78	1.90	2.13*	3.03*	4.13*
	14	1.09	1.17	1.40	1.53	1.66	1.79	2.07	2.21	2.50*	3.71*	5.47*
300	8	0.94	1.01	1.21	1.31	1.42	1.52	1.74	1.85	2.07*	2.89*	3.83*
	10	1.02	1.10	1.31	1.43	1.54	1.66	1.90	2.02	2.27*	3.24*	4.40*
	14	1.16	1.25	1.50	1.64	1.78	1.92	2.21	2.36	2.68*	3.96*	5.79*
350	8	0.99	1.07	1.27	1.38	1.49	1.61	1.83	1.95	2.18*	3.05*	4.04*
	10	1.08	1.16	1.39	1.51	1.63	1.76	2.01	2.14	2.40*	3.42*	4.65*
	14	1.23	1.33	1.60	1.74	1.89	2.04	2.35	2.51	2.84*	4.20*	6.10*
400	8	1.04	1.12	1.34	1.45	1.57	1.68	1.92	2.04	2.29*	3.20*	4.25*
	10	1.14	1.22	1.46	1.59	1.72	1.85	2.11	2.25	2.53*	3.60*	4.88*
	14	1.30	1.41	1.69	1.84	1.99	2.15	2.48	2.65	2.99*	4.43*	6.39*
450	8	1.09	1.17	1.40	1.51	1.64	1.76	2.01	2.13	2.39*	3.35*	4.44*
	10	1.19	1.28	1.53	1.66	1.80	1.93	2.21	2.35	2.64*	3.77*	5.11*
	14	1.37	1.48	1.77	1.93	2.09	2.26	2.60	2.78	3.14*	4.64*	6.67*
500	8	1.13	1.22	1.45	1.58	1.70	1.83	2.09	2.22	2.48*	3.49*	4.62*
	10	1.24	1.34	1.59	1.73	1.87	2.01	2.31	2.45	2.75*	3.93*	5.32*
	14	1.43	1.54	1.85	2.01	2.18	2.36	2.71	2.90	3.28*	4.84*	6.93*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.0 m (RADIUS = 3.5 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
		(m*s) ^{1/2}											
550	8	1.18	1.27	1.51	1.63	1.77	1.90	2.17	2.30	2.58*	3.62*	4.80*	
	10	1.29	1.39	1.66	1.80	1.94	2.09	2.40	2.55	2.86*	4.08*	5.53*	
	14	1.49	1.61	1.93	2.10	2.27	2.45	2.83	3.02	3.41*	5.03*	7.19*	
600	8	1.22	1.31	1.56	1.69	1.83	1.96	2.24	2.38	2.66*	3.75*	4.97*	
	10	1.33	1.44	1.72	1.86	2.01	2.17	2.48	2.64	2.96*	4.23*	5.73*	
	14	1.55	1.67	2.00	2.18	2.36	2.55	2.93	3.13	3.54*	5.22*	7.44*	
650	8	1.26	1.35	1.61	1.75	1.89	2.03	2.31	2.46	2.75*	3.87*	5.13*	
	10	1.38	1.49	1.77	1.93	2.08	2.24	2.57	2.73	3.06*	4.37*	5.92*	
	14	1.60	1.73	2.07	2.26	2.45	2.64	3.04	3.24	3.67*	5.40*	7.68*	
700	8	1.29	1.39	1.66	1.80	1.94	2.09	2.38	2.53	2.83*	3.99*	5.29*	
	10	1.42	1.53	1.83	1.99	2.15	2.31	2.65	2.82	3.16*	4.51*	6.10*	
	14	1.66	1.79	2.14	2.33	2.53	2.73	3.14	3.35	3.79*	5.58*	7.91*	
750	8	1.33	1.43	1.71	1.85	2.00	2.15	2.45	2.61	2.91*	4.10*	5.44*	
	10	1.47	1.58	1.88	2.05	2.21	2.38	2.72	2.90	3.25*	4.65*	6.28*	
	14	1.71	1.85	2.21	2.41	2.61	2.81	3.24	3.45	3.90*	5.75*	8.13*	
800	8	1.37	1.47	1.75	1.90	2.05	2.21	2.52	2.68	2.99*	4.22*	5.59*	
	10	1.51	1.62	1.94	2.10	2.28	2.45	2.80	2.98	3.34*	4.78*	6.45*	
	14	1.76	1.90	2.28	2.48	2.68	2.89	3.33	3.56	4.02*	5.91*	8.35*	
850	8	1.40	1.51	1.80	1.95	2.11	2.26	2.58	2.75	3.07*	4.33*	5.74*	
	10	1.55	1.67	1.99	2.16	2.34	2.51	2.88	3.06	3.43*	4.91*	6.62*	
	14	1.81	1.95	2.34	2.55	2.76	2.98	3.42	3.65	4.13*	6.07*	8.56*	
900	8	1.44	1.55	1.84	2.00	2.16	2.32	2.65	2.81	3.14*	4.43*	5.88*	
	10	1.59	1.71	2.04	2.22	2.40	2.58	2.95	3.14	3.52*	5.03*	6.79*	
	14	1.86	2.01	2.40	2.61	2.83	3.05	3.51	3.75	4.23*	6.23*	8.77*	
950	8	1.47	1.58	1.88	2.05	2.21	2.37	2.71	2.88	3.22*	4.54*	6.02*	
	10	1.63	1.75	2.09	2.27	2.45	2.64	3.02	3.21	3.60*	5.15*	6.95*	
	14	1.90	2.06	2.46	2.68	2.90	3.13	3.60	3.84	4.34*	6.38*	8.98*	
1000	8	1.50	1.62	1.93	2.09	2.26	2.43	2.77	2.94	3.29*	4.64*	6.15*	
	10	1.66	1.79	2.14	2.32	2.51	2.70	3.09	3.29	3.69*	5.27*	7.11*	
	14	1.95	2.11	2.52	2.75	2.97	3.21	3.69	3.94	4.44*	6.53*	9.18*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.0 m (RADIUS = 3.5 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	0.92	0.99	1.19	1.30	1.42	1.54	1.80	1.94	2.25*	4.09*	10.17*	
	10	0.97	1.05	1.28	1.40	1.54	1.68	1.99	2.17	2.61*	6.48*	18.21*	
	14	1.08	1.18	1.45	1.61	1.79	1.98	2.48	2.84	4.06*	15.27*	46.92*	
100	8	1.11	1.20	1.44	1.58	1.72	1.86	2.17	2.33	2.69*	4.51*	10.17*	
	10	1.19	1.29	1.57	1.72	1.88	2.05	2.42	2.63	3.11*	6.54*	18.21*	
	14	1.35	1.47	1.81	2.01	2.22	2.46	3.01	3.37	4.40*	15.27*	46.92*	
150	8	1.26	1.36	1.64	1.80	1.95	2.12	2.47	2.65	3.05*	4.97*	10.19*	
	10	1.37	1.48	1.80	1.98	2.16	2.35	2.77	3.01	3.53*	6.77*	18.21*	
	14	1.57	1.71	2.10	2.33	2.57	2.83	3.45	3.83	4.83*	15.27*	46.92*	
200	8	1.39	1.51	1.82	1.99	2.16	2.34	2.73	2.93	3.37*	5.39*	10.28*	
	10	1.52	1.65	2.00	2.20	2.40	2.61	3.07	3.33	3.89*	7.11*	18.21*	
	14	1.76	1.92	2.36	2.61	2.87	3.16	3.83	4.23	5.25*	15.27*	46.92*	
250	8	1.51	1.64	1.97	2.16	2.35	2.54	2.96	3.18	3.65*	5.79*	10.45*	
	10	1.66	1.80	2.18	2.39	2.62	2.85	3.35	3.62	4.22*	7.47*	18.21*	
	14	1.93	2.10	2.58	2.85	3.14	3.46	4.17	4.59	5.64*	15.28*	46.92*	
300	8	1.62	1.76	2.12	2.31	2.52	2.73	3.17	3.41	3.90*	6.15*	10.70*	
	10	1.79	1.94	2.35	2.58	2.81	3.06	3.59	3.88	4.52*	7.85*	18.22*	
	14	2.08	2.28	2.79	3.08	3.39	3.73	4.49	4.93	6.00*	15.30*	46.92*	
350	8	1.73	1.87	2.25	2.46	2.68	2.90	3.37	3.62	4.14*	6.50*	10.99*	
	10	1.90	2.07	2.51	2.75	3.00	3.26	3.83	4.13	4.80*	8.21*	18.23*	
	14	2.23	2.44	2.99	3.29	3.62	3.98	4.78	5.24	6.35*	15.35*	46.92*	
400	8	1.82	1.98	2.38	2.60	2.83	3.06	3.56	3.82	4.37*	6.82*	11.30*	
	10	2.02	2.19	2.65	2.91	3.17	3.45	4.04	4.36	5.06*	8.56*	18.27*	
	14	2.37	2.59	3.17	3.50	3.84	4.22	5.05	5.53	6.68*	15.45*	46.92*	
450	8	1.92	2.08	2.50	2.73	2.97	3.22	3.74	4.01	4.58*	7.13*	11.62*	
	10	2.12	2.31	2.79	3.06	3.34	3.63	4.25	4.59	5.31*	8.90*	18.34*	
	14	2.50	2.73	3.34	3.69	4.05	4.44	5.31	5.81	6.99*	15.58*	46.92*	
500	8	2.01	2.17	2.62	2.86	3.11	3.37	3.91	4.19	4.79*	7.43*	11.94*	
	10	2.23	2.42	2.93	3.21	3.50	3.80	4.45	4.80	5.55*	9.23*	18.44*	
	14	2.62	2.87	3.51	3.87	4.25	4.66	5.56	6.08	7.28*	15.74*	46.92*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.0 m (RADIUS = 3.5 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		(m*s) ^{1/2}										
		1	2	4	5	6	7	9	10	12	18	24
550	8	2.09	2.27	2.73	2.98	3.24	3.51	4.07	4.36	4.98*	7.71*	12.26*
	10	2.32	2.53	3.06	3.35	3.65	3.96	4.64	5.00	5.78*	9.55*	18.56*
	14	2.74	3.00	3.67	4.04	4.44	4.86	5.80	6.33	7.57*	15.94*	46.92*
600	8	2.17	2.36	2.84	3.10	3.37	3.64	4.22	4.53	5.17*	7.99*	12.58*
	10	2.42	2.63	3.18	3.48	3.79	4.12	4.82	5.19	6.00*	9.86*	18.72*
	14	2.86	3.13	3.82	4.21	4.62	5.06	6.03	6.58	7.85*	16.15*	46.92*
650	8	2.25	2.44	2.94	3.21	3.49	3.77	4.38	4.69	5.36*	8.25*	12.89*
	10	2.51	2.73	3.30	3.61	3.94	4.27	5.00	5.38	6.21*	10.16*	18.90*
	14	2.97	3.25	3.97	4.37	4.80	5.25	6.25	6.82	8.11*	16.38*	46.92*
700	8	2.33	2.53	3.04	3.32	3.61	3.90	4.52	4.85	5.53*	8.51*	13.20*
	10	2.60	2.82	3.41	3.74	4.07	4.42	5.17	5.56	6.42*	10.45*	19.10*
	14	3.08	3.37	4.11	4.53	4.97	5.43	6.47	7.05	8.37*	16.63*	46.92*
750	8	2.41	2.61	3.14	3.42	3.72	4.03	4.66	5.00	5.70*	8.76*	13.51*
	10	2.68	2.92	3.53	3.86	4.20	4.56	5.33	5.74	6.62*	10.74*	19.31*
	14	3.19	3.48	4.25	4.68	5.13	5.61	6.68	7.27	8.62*	16.88*	46.92*
800	8	2.48	2.69	3.23	3.53	3.83	4.15	4.80	5.15	5.87*	9.00*	13.81*
	10	2.77	3.01	3.63	3.98	4.33	4.70	5.49	5.91	6.81*	11.02*	19.54*
	14	3.29	3.60	4.39	4.83	5.29	5.79	6.88	7.49	8.87*	17.14*	46.92*
850	8	2.55	2.76	3.32	3.63	3.94	4.26	4.94	5.29	6.03*	9.23*	14.10*
	10	2.85	3.10	3.74	4.09	4.46	4.84	5.65	6.08	7.00*	11.29*	19.77*
	14	3.39	3.70	4.52	4.97	5.45	5.96	7.08	7.70	9.10*	17.40*	46.92*
900	8	2.62	2.84	3.41	3.72	4.05	4.38	5.07	5.43	6.19*	9.46*	14.39*
	10	2.93	3.18	3.84	4.21	4.58	4.97	5.80	6.24	7.18*	11.55*	20.02*
	14	3.49	3.81	4.65	5.11	5.61	6.13	7.27	7.90	9.34*	17.67*	46.92*
950	8	2.69	2.91	3.50	3.82	4.15	4.49	5.20	5.57	6.34*	9.69*	14.68*
	10	3.01	3.27	3.95	4.32	4.70	5.10	5.95	6.40	7.36*	11.81*	20.27*
	14	3.59	3.92	4.77	5.25	5.75	6.29	7.46	8.10	9.56*	17.93*	46.92*
1000	8	2.75	2.98	3.59	3.91	4.25	4.60	5.32	5.70	6.49*	9.91*	14.96*
	10	3.08	3.35	4.05	4.42	4.82	5.23	6.10	6.56	7.54*	12.07*	20.52*
	14	3.68	4.02	4.90	5.39	5.90	6.45	7.64	8.30	9.78*	18.20*	46.92*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.0 m (RADIUS = 3.5 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	1.50	1.65	2.08	2.35	2.66	3.06	4.48	5.84	10.14*	43.18*	137.16*
	10	1.63	1.81	2.35	2.72	3.22	3.99	7.36	10.11	18.39*	82.52*	265.70*
	14	1.88	2.15	3.04	3.90	5.59	8.41	17.96	25.39	47.85*	223.09*	725.06*
100	8	1.89	2.08	2.61	2.93	3.30	3.74	5.01	6.09	10.15*	43.18*	137.16*
	10	2.08	2.31	2.98	3.40	3.93	4.64	7.43	10.11	18.39*	82.52*	265.70*
	14	2.45	2.78	3.81	4.62	5.96	8.45	17.96	25.39	47.85*	223.09*	725.06*
150	8	2.20	2.43	3.04	3.40	3.81	4.29	5.58	6.56	10.19*	43.18*	137.16*
	10	2.44	2.71	3.47	3.95	4.52	5.24	7.73	10.17	18.39*	82.52*	265.70*
	14	2.90	3.28	4.43	5.28	6.52	8.67	17.96	25.39	47.85*	223.09*	725.06*
200	8	2.48	2.73	3.41	3.81	4.26	4.77	6.10	7.05	10.35*	43.18*	137.16*
	10	2.76	3.06	3.90	4.42	5.03	5.78	8.16	10.35	18.39*	82.52*	265.70*
	14	3.29	3.72	4.97	5.86	7.09	9.05	17.96	25.39	47.85*	223.09*	725.06*
250	8	2.72	3.00	3.74	4.17	4.66	5.20	6.59	7.54	10.62*	43.18*	137.16*
	10	3.04	3.37	4.29	4.85	5.50	6.28	8.62	10.65	18.39*	82.52*	265.70*
	14	3.64	4.11	5.46	6.39	7.64	9.50	17.97	25.39	47.85*	223.09*	725.06*
300	8	2.95	3.25	4.04	4.51	5.02	5.60	7.04	8.00	10.95*	43.18*	137.16*
	10	3.30	3.66	4.64	5.24	5.92	6.74	9.09	11.00	18.41*	82.52*	265.70*
	14	3.97	4.47	5.90	6.88	8.15	9.97	18.01	25.39	47.85*	223.09*	725.06*
350	8	3.16	3.48	4.33	4.82	5.36	5.97	7.46	8.43	11.31*	43.18*	137.16*
	10	3.55	3.93	4.97	5.60	6.32	7.17	9.54	11.39	18.46*	82.52*	265.70*
	14	4.27	4.80	6.32	7.33	8.63	10.44	18.08	25.39	47.85*	223.09*	725.06*
400	8	3.36	3.70	4.59	5.11	5.68	6.32	7.86	8.85	11.69*	43.18*	137.16*
	10	3.78	4.18	5.28	5.94	6.70	7.57	9.97	11.79	18.54*	82.52*	265.70*
	14	4.55	5.12	6.71	7.76	9.09	10.90	18.21	25.40	47.85*	223.09*	725.06*
450	8	3.55	3.90	4.85	5.39	5.99	6.65	8.24	9.25	12.07*	43.18*	137.16*
	10	3.99	4.42	5.58	6.27	7.05	7.96	10.39	12.19	18.67*	82.52*	265.70*
	14	4.82	5.42	7.08	8.17	9.53	11.34	18.38	25.42	47.85*	223.09*	725.06*
500	8	3.73	4.10	5.09	5.66	6.28	6.96	8.61	9.63	12.45*	43.18*	137.16*
	10	4.20	4.65	5.86	6.58	7.39	8.32	10.80	12.58	18.83*	82.52*	265.70*
	14	5.08	5.71	7.44	8.56	9.95	11.78	18.60	25.46	47.85*	223.09*	725.06*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.0 m (RADIUS = 3.5 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
		(m*s) ^{1/2}											
550	8	3.90	4.29	5.32	5.91	6.56	7.27	8.96	10.00	12.83*	43.18*	137.16*	
	10	4.40	4.87	6.13	6.88	7.71	8.68	11.19	12.97	19.03*	82.52*	265.70*	
	14	5.33	5.98	7.78	8.94	10.36	12.20	18.85	25.51	47.85*	223.09*	725.06*	
600	8	4.07	4.48	5.54	6.16	6.82	7.56	9.29	10.36	13.19*	43.18*	137.16*	
	10	4.60	5.09	6.39	7.16	8.03	9.02	11.57	13.35	19.26*	82.52*	265.70*	
	14	5.57	6.25	8.11	9.30	10.75	12.61	19.13	25.59	47.85*	223.09*	725.06*	
650	8	4.23	4.65	5.76	6.39	7.08	7.84	9.62	10.70	13.56*	43.18*	137.16*	
	10	4.78	5.29	6.64	7.44	8.33	9.34	11.94	13.73	19.51*	82.52*	265.70*	
	14	5.80	6.50	8.42	9.65	11.13	13.01	19.42	25.70	47.85*	223.09*	725.06*	
700	8	4.39	4.83	5.97	6.62	7.33	8.11	9.93	11.04	13.91*	43.18*	137.16*	
	10	4.96	5.49	6.88	7.70	8.62	9.66	12.30	14.10	19.78*	82.52*	265.70*	
	14	6.03	6.75	8.73	9.98	11.49	13.39	19.73	25.83	47.85*	223.09*	725.06*	
750	8	4.54	4.99	6.17	6.85	7.58	8.37	10.24	11.36	14.26*	43.19*	137.16*	
	10	5.14	5.68	7.12	7.96	8.90	9.97	12.66	14.46	20.06*	82.52*	265.70*	
	14	6.24	6.99	9.03	10.31	11.85	13.77	20.05	25.99	47.85*	223.09*	725.06*	
800	8	4.69	5.15	6.37	7.06	7.81	8.63	10.54	11.68	14.60*	43.19*	137.16*	
	10	5.31	5.87	7.35	8.22	9.18	10.27	13.00	14.81	20.35*	82.52*	265.70*	
	14	6.45	7.22	9.31	10.63	12.19	14.14	20.38	26.17	47.86*	223.09*	725.06*	
850	8	4.84	5.31	6.56	7.27	8.04	8.88	10.83	11.99	14.93*	43.20*	137.16*	
	10	5.48	6.05	7.57	8.46	9.45	10.56	13.33	15.16	20.65*	82.52*	265.70*	
	14	6.66	7.45	9.60	10.94	12.53	14.50	20.71	26.36	47.86*	223.09*	725.06*	
900	8	4.98	5.47	6.75	7.48	8.27	9.12	11.11	12.29	15.26*	43.21*	137.16*	
	10	5.64	6.23	7.79	8.70	9.71	10.84	13.66	15.50	20.95*	82.52*	265.70*	
	14	6.86	7.67	9.87	11.24	12.86	14.85	21.04	26.58	47.86*	223.09*	725.06*	
950	8	5.11	5.62	6.93	7.68	8.49	9.36	11.38	12.58	15.58*	43.23*	137.16*	
	10	5.80	6.40	8.00	8.93	9.97	11.12	13.98	15.83	21.25*	82.52*	265.70*	
	14	7.06	7.89	10.14	11.53	13.18	15.20	21.37	26.81	47.87*	223.09*	725.06*	
1000	8	5.25	5.77	7.11	7.88	8.70	9.59	11.65	12.87	15.89*	43.26*	137.16*	
	10	5.95	6.57	8.21	9.16	10.22	11.39	14.29	16.16	21.56*	82.52*	265.70*	
	14	7.25	8.10	10.40	11.82	13.50	15.53	21.70	27.05	47.87*	223.09*	725.06*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.0 m (RADIUS = 3.5 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	2.71	3.20	5.65	9.20	14.89	23.24	51.49	73.56	140.38*	662.85*	2160.8*
	10	3.07	3.83	9.60	16.75	27.75	43.97	98.96	141.97	272.30*	1292.2*	4217.4*
	14	3.90	5.96	24.27	43.70	73.72	118.07	268.62	386.46	743.75*	3541.5*	11567.*
100	8	3.53	4.13	6.44	9.33	14.89	23.24	51.49	73.56	140.38*	662.85*	2160.8*
	10	4.03	4.90	9.73	16.75	27.75	43.97	98.96	141.97	272.30*	1292.2*	4217.4*
	14	5.11	7.00	24.27	43.70	73.72	118.07	268.62	386.46	743.75*	3541.5*	11567.*
150	8	4.19	4.87	7.26	9.79	14.91	23.24	51.49	73.56	140.38*	662.85*	2160.8*
	10	4.80	5.76	10.21	16.76	27.75	43.97	98.96	141.97	272.30*	1292.2*	4217.4*
	14	6.08	8.00	24.27	43.70	73.72	118.07	268.62	386.46	743.75*	3541.5*	11567.*
200	8	4.76	5.51	8.02	10.40	15.04	23.24	51.49	73.56	140.38*	662.85*	2160.8*
	10	5.47	6.51	10.85	16.83	27.75	43.97	98.96	141.97	272.30*	1292.2*	4217.4*
	14	6.92	8.91	24.27	43.70	73.72	118.07	268.62	386.46	743.75*	3541.5*	11567.*
250	8	5.27	6.08	8.71	11.04	15.30	23.25	51.49	73.56	140.38*	662.85*	2160.8*
	10	6.06	7.18	11.53	17.03	27.75	43.97	98.96	141.97	272.30*	1292.2*	4217.4*
	14	7.67	9.73	24.29	43.70	73.72	118.07	268.62	386.46	743.75*	3541.5*	11567.*
300	8	5.75	6.61	9.36	11.67	15.68	23.28	51.49	73.56	140.38*	662.85*	2160.8*
	10	6.61	7.79	12.20	17.34	27.76	43.97	98.96	141.97	272.30*	1292.2*	4217.4*
	14	8.36	10.50	24.36	43.70	73.72	118.07	268.62	386.46	743.75*	3541.5*	11567.*
350	8	6.19	7.10	9.96	12.28	16.12	23.36	51.49	73.56	140.38*	662.85*	2160.8*
	10	7.12	8.37	12.85	17.74	27.78	43.97	98.96	141.97	272.30*	1292.2*	4217.4*
	14	9.00	11.22	24.50	43.70	73.72	118.07	268.62	386.46	743.75*	3541.5*	11567.*
400	8	6.60	7.57	10.53	12.87	16.60	23.49	51.49	73.56	140.38*	662.85*	2160.8*
	10	7.61	8.91	13.47	18.20	27.84	43.97	98.96	141.97	272.30*	1292.2*	4217.4*
	14	9.61	11.90	24.71	43.70	73.72	118.07	268.62	386.46	743.75*	3541.5*	11567.*
450	8	7.00	8.01	11.08	13.44	17.10	23.69	51.49	73.56	140.38*	662.85*	2160.8*
	10	8.06	9.42	14.08	18.69	27.94	43.97	98.96	141.97	272.30*	1292.2*	4217.4*
	14	10.19	12.54	24.99	43.71	73.72	118.07	268.62	386.46	743.75*	3541.5*	11567.*
500	8	7.37	8.43	11.60	14.00	17.61	23.93	51.49	73.56	140.38*	662.85*	2160.8*
	10	8.50	9.91	14.66	19.19	28.08	43.98	98.96	141.97	272.30*	1292.2*	4217.4*
	14	10.73	13.16	25.34	43.71	73.72	118.07	268.62	386.46	743.75*	3541.5*	11567.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.0 m (RADIUS = 3.5 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	7.73	8.83	12.09	14.53	18.11	24.22	51.49	73.56	140.38*	662.85*	2160.8*
	10	8.92	10.38	15.22	19.71	28.27	43.98	98.96	141.97	272.30*	1292.2*	4217.4*
	14	11.26	13.75	25.73	43.72	73.72	118.07	268.62	386.46	743.75*	3541.5*	11567.*
600	8	8.08	9.22	12.57	15.04	18.61	24.55	51.49	73.56	140.38*	662.85*	2160.8*
	10	9.32	10.83	15.77	20.22	28.50	43.99	98.96	141.97	272.30*	1292.2*	4217.4*
	14	11.77	14.32	26.15	43.74	73.72	118.07	268.62	386.46	743.75*	3541.5*	11567.*
650	8	8.42	9.59	13.04	15.54	19.11	24.91	51.49	73.56	140.38*	662.85*	2160.8*
	10	9.71	11.27	16.30	20.73	28.78	44.01	98.96	141.97	272.30*	1292.2*	4217.4*
	14	12.25	14.87	26.59	43.78	73.72	118.07	268.62	386.46	743.75*	3541.5*	11567.*
700	8	8.74	9.95	13.49	16.03	19.60	25.28	51.50	73.56	140.38*	662.85*	2160.8*
	10	10.09	11.69	16.81	21.24	29.08	44.03	98.96	141.97	272.30*	1292.2*	4217.4*
	14	12.73	15.40	27.06	43.83	73.72	118.07	268.62	386.46	743.75*	3541.5*	11567.*
750	8	9.06	10.30	13.92	16.50	20.08	25.67	51.50	73.56	140.38*	662.85*	2160.8*
	10	10.45	12.10	17.32	21.74	29.41	44.07	98.96	141.97	272.30*	1292.2*	4217.4*
	14	13.19	15.91	27.53	43.91	73.72	118.07	268.62	386.46	743.75*	3541.5*	11567.*
800	8	9.36	10.64	14.35	16.96	20.55	26.06	51.51	73.56	140.38*	662.85*	2160.8*
	10	10.81	12.50	17.80	22.23	29.76	44.13	98.96	141.97	272.30*	1292.2*	4217.4*
	14	13.63	16.42	28.01	44.00	73.72	118.07	268.62	386.46	743.75*	3541.5*	11567.*
850	8	9.66	10.98	14.76	17.41	21.02	26.47	51.52	73.56	140.38*	662.85*	2160.8*
	10	11.15	12.88	18.28	22.72	30.13	44.20	98.96	141.97	272.30*	1292.2*	4217.4*
	14	14.07	16.91	28.49	44.12	73.73	118.07	268.62	386.46	743.75*	3541.5*	11567.*
900	8	9.95	11.30	15.16	17.85	21.47	26.88	51.55	73.56	140.38*	662.85*	2160.8*
	10	11.49	13.26	18.74	23.19	30.50	44.29	98.96	141.97	272.30*	1292.2*	4217.4*
	14	14.49	17.38	28.97	44.27	73.73	118.07	268.62	386.46	743.75*	3541.5*	11567.*
950	8	10.24	11.62	15.56	18.28	21.92	27.29	51.57	73.56	140.38*	662.85*	2160.8*
	10	11.82	13.63	19.20	23.67	30.89	44.40	98.96	141.97	272.30*	1292.2*	4217.4*
	14	14.91	17.85	29.46	44.44	73.73	118.07	268.62	386.46	743.75*	3541.5*	11567.*
1000	8	10.52	11.93	15.94	18.70	22.36	27.70	51.61	73.56	140.38*	662.85*	2160.8*
	10	12.14	13.99	19.65	24.13	31.29	44.53	98.96	141.97	272.30*	1292.2*	4217.4*
	14	15.31	18.30	29.94	44.63	73.73	118.07	268.62	386.46	743.75*	3541.5*	11567.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.5 m (RADIUS = 3.9 m)
FIRE GROWTH: ULTRAFast (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	0.65	0.68	0.80	0.87	0.93	1.00	1.13	1.20	1.34	1.81*	2.39*
	10	0.68	0.72	0.84	0.91	0.98	1.05	1.20	1.27	1.43	1.98*	2.76*
	14	0.73	0.78	0.92	1.00	1.08	1.16	1.33	1.42	1.61	2.42*	4.40*
100	8	0.75	0.79	0.93	1.01	1.08	1.16	1.32	1.40	1.56	2.12*	2.80*
	10	0.79	0.84	0.99	1.07	1.16	1.24	1.41	1.50	1.68	2.34*	3.22*
	14	0.88	0.93	1.10	1.20	1.29	1.39	1.60	1.71	1.93	2.86*	4.60*
150	8	0.83	0.88	1.04	1.12	1.21	1.29	1.47	1.56	1.74	2.37*	3.13*
	10	0.89	0.95	1.11	1.20	1.30	1.39	1.59	1.69	1.89	2.63*	3.60*
	14	0.99	1.06	1.25	1.36	1.47	1.58	1.82	1.94	2.19	3.22*	4.95*
200	8	0.91	0.96	1.13	1.22	1.31	1.41	1.60	1.69	1.89	2.59*	3.42*
	10	0.97	1.04	1.22	1.32	1.42	1.52	1.74	1.84	2.07	2.89*	3.93*
	14	1.10	1.17	1.38	1.50	1.62	1.75	2.00	2.14	2.42	3.54*	5.31*
250	8	0.97	1.03	1.21	1.31	1.41	1.51	1.71	1.82	2.03	2.78*	3.68*
	10	1.05	1.12	1.31	1.42	1.53	1.64	1.87	1.99	2.23	3.11*	4.23*
	14	1.19	1.27	1.50	1.63	1.76	1.89	2.17	2.32	2.62	3.82*	5.65*
300	8	1.03	1.10	1.29	1.39	1.50	1.60	1.82	1.93	2.16	2.96*	3.91*
	10	1.12	1.19	1.40	1.52	1.63	1.75	2.00	2.12	2.38	3.32*	4.50*
	14	1.27	1.36	1.61	1.75	1.88	2.03	2.33	2.48	2.80	4.08*	5.98*
350	8	1.09	1.16	1.36	1.47	1.58	1.69	1.92	2.04	2.27	3.13*	4.13*
	10	1.18	1.26	1.48	1.60	1.73	1.85	2.11	2.24	2.51	3.51*	4.76*
	14	1.35	1.45	1.71	1.85	2.00	2.15	2.47	2.63	2.98	4.33*	6.29*
400	8	1.14	1.22	1.43	1.54	1.66	1.78	2.02	2.14	2.39	3.28*	4.34*
	10	1.25	1.33	1.56	1.69	1.82	1.95	2.22	2.36	2.64	3.70*	5.00*
	14	1.43	1.53	1.81	1.96	2.11	2.27	2.61	2.78	3.14	4.56*	6.59*
450	8	1.19	1.27	1.49	1.61	1.73	1.85	2.11	2.23	2.49	3.43*	4.54*
	10	1.30	1.39	1.63	1.77	1.90	2.04	2.32	2.47	2.77	3.87*	5.23*
	14	1.50	1.61	1.90	2.06	2.22	2.39	2.74	2.92	3.29	4.78*	6.87*
500	8	1.24	1.32	1.55	1.68	1.80	1.93	2.19	2.32	2.59	3.57*	4.72*
	10	1.36	1.45	1.70	1.84	1.98	2.13	2.42	2.57	2.88	4.03*	5.45*
	14	1.57	1.68	1.98	2.15	2.32	2.50	2.86	3.05	3.44	4.98*	7.14*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.5 m (RADIUS = 3.9 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		(m*s) ^{1/2}										
		1	2	4	5	6	7	9	10	12	18	24
550	8	1.29	1.37	1.61	1.74	1.87	2.00	2.27	2.41	2.69	3.71*	4.90*
	10	1.41	1.51	1.77	1.92	2.06	2.21	2.52	2.68	3.00	4.19*	5.66*
	14	1.64	1.75	2.07	2.24	2.42	2.60	2.98	3.17	3.58	5.18*	7.40*
600	8	1.33	1.42	1.67	1.80	1.94	2.07	2.35	2.50	2.79	3.84*	5.08*
	10	1.46	1.56	1.84	1.99	2.14	2.29	2.61	2.77	3.10	4.34*	5.86*
	14	1.70	1.82	2.15	2.33	2.51	2.70	3.09	3.30	3.72	5.38*	7.65*
650	8	1.38	1.47	1.72	1.86	2.00	2.14	2.43	2.58	2.88	3.97*	5.24*
	10	1.51	1.62	1.90	2.05	2.21	2.37	2.70	2.87	3.21	4.49*	6.06*
	14	1.76	1.88	2.22	2.41	2.60	2.80	3.20	3.41	3.85	5.56*	7.90*
700	8	1.42	1.51	1.77	1.92	2.06	2.21	2.51	2.66	2.96	4.09*	5.41*
	10	1.56	1.67	1.96	2.12	2.28	2.45	2.78	2.96	3.31	4.63*	6.25*
	14	1.82	1.95	2.30	2.49	2.69	2.89	3.31	3.53	3.98	5.74*	8.13*
750	8	1.46	1.56	1.83	1.97	2.12	2.27	2.58	2.73	3.05	4.21*	5.56*
	10	1.61	1.72	2.02	2.18	2.35	2.52	2.87	3.05	3.41	4.77*	6.43*
	14	1.88	2.01	2.37	2.57	2.77	2.98	3.41	3.64	4.10	5.91*	8.36*
800	8	1.50	1.60	1.88	2.03	2.18	2.33	2.65	2.81	3.13	4.32*	5.71*
	10	1.66	1.77	2.08	2.24	2.42	2.59	2.95	3.13	3.51	4.91*	6.61*
	14	1.93	2.07	2.44	2.65	2.86	3.07	3.51	3.74	4.22	6.08*	8.58*
850	8	1.54	1.64	1.92	2.08	2.23	2.39	2.72	2.88	3.21	4.44*	5.86*
	10	1.70	1.81	2.13	2.31	2.48	2.66	3.03	3.22	3.60	5.04*	6.78*
	14	1.99	2.13	2.51	2.72	2.94	3.16	3.61	3.85	4.34	6.25*	8.80*
900	8	1.58	1.68	1.97	2.13	2.29	2.45	2.78	2.95	3.29	4.55*	6.01*
	10	1.74	1.86	2.19	2.36	2.54	2.73	3.10	3.30	3.69	5.16*	6.95*
	14	2.04	2.19	2.58	2.79	3.01	3.24	3.71	3.95	4.45	6.41*	9.02*
950	8	1.62	1.72	2.02	2.18	2.34	2.51	2.85	3.02	3.37	4.65*	6.15*
	10	1.79	1.91	2.24	2.42	2.61	2.80	3.18	3.38	3.78	5.29*	7.11*
	14	2.09	2.24	2.65	2.87	3.09	3.32	3.80	4.05	4.56	6.57*	9.22*
1000	8	1.65	1.76	2.06	2.23	2.40	2.57	2.91	3.09	3.44	4.76*	6.29*
	10	1.83	1.95	2.29	2.48	2.67	2.86	3.25	3.46	3.87	5.41*	7.27*
	14	2.15	2.30	2.71	2.94	3.17	3.40	3.89	4.15	4.67	6.72*	9.43*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.5 m (RADIUS = 3.9 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX
RATE OF RISE
°C/min

CEILING HEIGHT, m

(m*s) ^{1/2}	1	2	4	5	6	7	9	10	12	18	24
50	1.00 1.06 1.18	1.07 1.14 1.28	1.27 1.36 1.56	1.38 1.49 1.72	1.50 1.63 1.90	1.62 1.77 2.11	1.88 2.10 2.65	2.03 2.28 3.05	2.35 2.76 4.47	4.36* 7.02* 16.71*	10.88* 19.57* 50.61*
100	1.21 1.31 1.48	1.29 1.40 1.60	1.54 1.68 1.95	1.67 1.83 2.15	1.82 2.00 2.37	1.96 2.17 2.62	2.28 2.56 3.21	2.45 2.77 3.60	2.82 3.29 4.76	4.73* 7.05* 16.71*	10.88* 19.57* 50.61*
150	1.38 1.50 1.72	1.48 1.61 1.86	1.75 1.93 2.26	1.91 2.11 2.49	2.07 2.29 2.75	2.24 2.49 3.02	2.60 2.93 3.67	2.79 3.17 4.08	3.21 3.73 5.19	5.18* 7.23* 16.71*	10.89* 19.57* 50.61*
200	1.53 1.67 1.93	1.63 1.79 2.09	1.94 2.15 2.54	2.11 2.34 2.79	2.29 2.55 3.07	2.48 2.77 3.37	2.87 3.25 4.08	3.08 3.51 4.50	3.54 4.11 5.62	5.61* 7.53* 16.71*	10.95* 19.57* 50.61*
250	1.66 1.82 2.12	1.78 1.96 2.29	2.11 2.34 2.78	2.30 2.56 3.06	2.49 2.78 3.36	2.69 3.02 3.69	3.12 3.54 4.44	3.34 3.82 4.89	3.83 4.45 6.02	6.01* 7.88* 16.71*	11.08* 19.57* 50.61*
300	1.78 1.96 2.29	1.91 2.11 2.48	2.27 2.52 3.01	2.47 2.75 3.31	2.68 3.00 3.63	2.89 3.25 3.98	3.34 3.80 4.77	3.58 4.10 5.24	4.10 4.77 6.40	6.38* 8.24* 16.72*	11.29* 19.57* 50.61*
350	1.90 2.09 2.46	2.03 2.25 2.66	2.42 2.69 3.22	2.63 2.94 3.54	2.85 3.19 3.88	3.07 3.46 4.24	3.55 4.05 5.08	3.81 4.36 5.57	4.36 5.07 6.77	6.74* 8.60* 16.75*	11.55* 19.58* 50.61*
400	2.01 2.22 2.61	2.15 2.39 2.82	2.55 2.85 3.42	2.78 3.11 3.75	3.01 3.38 4.11	3.25 3.67 4.50	3.75 4.28 5.37	4.02 4.61 5.88	4.60 5.34 7.11	7.07* 8.96* 16.81*	11.84* 19.60* 50.61*
450	2.11 2.34 2.75	2.26 2.51 2.98	2.69 3.00 3.60	2.92 3.27 3.96	3.16 3.56 4.33	3.41 3.86 4.74	3.94 4.50 5.65	4.22 4.84 6.18	4.82 5.61 7.44	7.39* 9.30* 16.90*	12.15* 19.65* 50.61*
500	2.21 2.45 2.89	2.37 2.64 3.13	2.81 3.15 3.78	3.05 3.43 4.15	3.31 3.73 4.55	3.57 4.04 4.97	4.12 4.71 5.92	4.41 5.07 6.46	5.04 5.86 7.75	7.69* 9.64* 17.02*	12.46* 19.71* 50.61*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.5 m (RADIUS = 3.9 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	2.30	2.47	2.93	3.18	3.45	3.72	4.30	4.60	5.24	7.98*	12.78*
	10	2.56	2.75	3.29	3.58	3.89	4.21	4.91	5.28	6.10	9.96*	19.81*
	14	3.03	3.28	3.96	4.34	4.75	5.19	6.17	6.73	8.05	17.18*	50.61*
600	8	2.39	2.57	3.05	3.31	3.58	3.87	4.46	4.78	5.44	8.26*	13.10*
	10	2.66	2.87	3.42	3.73	4.05	4.38	5.10	5.49	6.33	10.27*	19.93*
	14	3.16	3.42	4.12	4.52	4.95	5.40	6.41	6.99	8.34	17.36*	50.61*
650	8	2.48	2.66	3.16	3.43	3.71	4.01	4.62	4.95	5.64	8.53*	13.41*
	10	2.76	2.97	3.55	3.87	4.20	4.55	5.29	5.69	6.56	10.58*	20.08*
	14	3.28	3.55	4.28	4.70	5.13	5.60	6.65	7.24	8.62	17.56*	50.61*
700	8	2.57	2.75	3.27	3.55	3.84	4.14	4.78	5.11	5.82	8.79*	13.72*
	10	2.86	3.08	3.67	4.00	4.34	4.70	5.47	5.88	6.78	10.88*	20.25*
	14	3.40	3.68	4.44	4.86	5.32	5.80	6.88	7.48	8.89	17.78*	50.61*
750	8	2.65	2.84	3.37	3.66	3.96	4.27	4.93	5.27	6.00	9.05*	14.02*
	10	2.96	3.18	3.79	4.13	4.49	4.86	5.64	6.07	6.99	11.17*	20.44*
	14	3.52	3.81	4.59	5.03	5.50	5.99	7.10	7.72	9.16	18.01*	50.61*
800	8	2.73	2.93	3.47	3.77	4.08	4.40	5.08	5.43	6.18	9.30*	14.33*
	10	3.05	3.28	3.91	4.26	4.63	5.00	5.81	6.25	7.19	11.45*	20.64*
	14	3.63	3.93	4.74	5.19	5.67	6.18	7.31	7.95	9.42	18.25*	50.61*
850	8	2.81	3.01	3.57	3.88	4.20	4.53	5.22	5.58	6.35	9.54*	14.62*
	10	3.14	3.38	4.03	4.39	4.76	5.15	5.98	6.43	7.39	11.73*	20.86*
	14	3.74	4.05	4.88	5.34	5.84	6.36	7.52	8.17	9.67	18.50*	50.61*
900	8	2.88	3.10	3.67	3.99	4.31	4.65	5.36	5.73	6.52	9.78*	14.92*
	10	3.23	3.47	4.14	4.51	4.89	5.29	6.14	6.60	7.58	12.00*	21.09*
	14	3.85	4.17	5.02	5.49	6.00	6.54	7.73	8.39	9.91	18.75*	50.61*
950	8	2.96	3.18	3.77	4.09	4.42	4.77	5.49	5.87	6.68	10.01*	15.20*
	10	3.31	3.57	4.25	4.63	5.02	5.43	6.30	6.77	7.77	12.27*	21.32*
	14	3.96	4.28	5.15	5.64	6.16	6.71	7.93	8.60	10.15	19.01*	50.61*
1000	8	3.03	3.26	3.86	4.19	4.53	4.89	5.63	6.02	6.84	10.23*	15.49*
	10	3.40	3.66	4.36	4.74	5.15	5.56	6.46	6.93	7.96	12.53*	21.56*
	14	4.06	4.39	5.29	5.79	6.32	6.88	8.12	8.81	10.39	19.26*	50.61*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.5 m (RADIUS = 3.9 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		TIME INDEX											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	1.65	1.79	2.24	2.52	2.87	3.32	5.00	6.58	11.37	47.43*	148.13*	
	10	1.80	1.98	2.55	2.96	3.54	4.47	8.41	11.52	20.76	90.79*	287.10*	
	14	2.08	2.36	3.38	4.47	6.58	9.88	20.79	29.19	54.30	245.75*	783.73*	
100	8	2.08	2.27	2.82	3.16	3.55	4.02	5.47	6.74	11.37	47.43*	148.13*	
	10	2.30	2.53	3.23	3.69	4.28	5.09	8.45	11.52	20.76	90.79*	287.10*	
	14	2.71	3.06	4.19	5.15	6.82	9.89	20.79	29.19	54.30	245.75*	783.73*	
150	8	2.43	2.65	3.28	3.66	4.10	4.61	6.04	7.17	11.40	47.43*	148.13*	
	10	2.70	2.97	3.77	4.28	4.90	5.71	8.66	11.54	20.76	90.79*	287.10*	
	14	3.21	3.61	4.86	5.83	7.33	10.01	20.79	29.19	54.30	245.75*	783.73*	
200	8	2.73	2.98	3.68	4.10	4.58	5.12	6.58	7.66	11.50	47.43*	148.13*	
	10	3.05	3.35	4.23	4.79	5.45	6.28	9.04	11.66	20.76	90.79*	287.10*	
	14	3.64	4.09	5.45	6.45	7.90	10.30	20.79	29.19	54.30	245.75*	783.73*	
250	8	3.00	3.27	4.04	4.49	5.00	5.58	7.09	8.15	11.72	47.43*	148.13*	
	10	3.36	3.70	4.65	5.25	5.95	6.81	9.48	11.89	20.76	90.79*	287.10*	
	14	4.04	4.52	5.98	7.01	8.45	10.70	20.80	29.19	54.30	245.75*	783.73*	
300	8	3.25	3.55	4.37	4.85	5.40	6.01	7.57	8.62	12.01	47.43*	148.13*	
	10	3.65	4.01	5.04	5.67	6.41	7.30	9.94	12.20	20.77	90.79*	287.10*	
	14	4.40	4.92	6.46	7.54	8.99	11.15	20.81	29.19	54.30	245.75*	783.73*	
350	8	3.49	3.80	4.68	5.19	5.76	6.41	8.01	9.08	12.35	47.43*	148.13*	
	10	3.92	4.31	5.40	6.06	6.83	7.75	10.40	12.56	20.79	90.79*	287.10*	
	14	4.73	5.29	6.92	8.03	9.50	11.61	20.85	29.19	54.30	245.75*	783.73*	
400	8	3.71	4.04	4.97	5.51	6.11	6.78	8.44	9.52	12.72	47.43*	148.13*	
	10	4.18	4.59	5.73	6.43	7.23	8.18	10.85	12.94	20.84	90.79*	287.10*	
	14	5.05	5.64	7.34	8.49	9.98	12.07	20.92	29.20	54.30	245.75*	783.73*	
450	8	3.92	4.27	5.24	5.81	6.43	7.13	8.84	9.93	13.10	47.43*	148.13*	
	10	4.42	4.85	6.05	6.78	7.62	8.59	11.29	13.33	20.92	90.79*	287.10*	
	14	5.35	5.97	7.74	8.93	10.45	12.53	21.03	29.20	54.30	245.75*	783.73*	
500	8	4.12	4.49	5.50	6.10	6.75	7.47	9.22	10.34	13.48	47.43*	148.13*	
	10	4.65	5.10	6.36	7.12	7.98	8.99	11.71	13.73	21.04	90.79*	287.10*	
	14	5.64	6.28	8.13	9.35	10.90	12.98	21.18	29.22	54.30	245.75*	783.73*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.5 m (RADIUS = 3.9 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
		(m*s) ^{1/2}										
550	8	4.31	4.70	5.76	6.37	7.04	7.79	9.59	10.73	13.86	47.43*	148.13*
	10	4.87	5.34	6.65	7.44	8.33	9.36	12.12	14.13	21.20	90.79*	287.10*
	14	5.91	6.59	8.50	9.76	11.33	13.42	21.37	29.24	54.30	245.75*	783.73*
600	8	4.50	4.90	6.00	6.63	7.33	8.10	9.95	11.10	14.24	47.43*	148.13*
	10	5.08	5.58	6.93	7.74	8.66	9.72	12.52	14.52	21.38	90.79*	287.10*
	14	6.18	6.88	8.85	10.14	11.74	13.84	21.60	29.29	54.30	245.75*	783.73*
650	8	4.68	5.09	6.23	6.89	7.61	8.40	10.30	11.46	14.61	47.43*	148.13*
	10	5.29	5.80	7.20	8.04	8.99	10.07	12.91	14.90	21.60	90.79*	287.10*
	14	6.44	7.16	9.20	10.52	12.15	14.26	21.85	29.35	54.30	245.75*	783.73*
700	8	4.85	5.28	6.46	7.14	7.88	8.69	10.63	11.82	14.97	47.43*	148.13*
	10	5.49	6.02	7.47	8.33	9.30	10.41	13.29	15.28	21.84	90.79*	287.10*
	14	6.68	7.43	9.53	10.88	12.54	14.67	22.12	29.43	54.30	245.75*	783.73*
750	8	5.02	5.47	6.68	7.38	8.14	8.98	10.95	12.16	15.33	47.43*	148.13*
	10	5.69	6.23	7.72	8.61	9.61	10.74	13.66	15.66	22.10	90.79*	287.10*
	14	6.92	7.69	9.85	11.24	12.92	15.07	22.41	29.53	54.30	245.75*	783.73*
800	8	5.18	5.64	6.89	7.61	8.39	9.25	11.27	12.50	15.69	47.44*	148.13*
	10	5.87	6.44	7.97	8.88	9.90	11.06	14.02	16.02	22.37	90.79*	287.10*
	14	7.16	7.95	10.17	11.58	13.29	15.46	22.71	29.66	54.30	245.75*	783.73*
850	8	5.34	5.82	7.10	7.84	8.64	9.52	11.58	12.82	16.03	47.44*	148.13*
	10	6.06	6.64	8.21	9.15	10.19	11.37	14.37	16.38	22.65	90.79*	287.10*
	14	7.39	8.20	10.47	11.91	13.65	15.84	23.03	29.81	54.30	245.75*	783.73*
900	8	5.50	5.99	7.30	8.06	8.88	9.78	11.88	13.14	16.37	47.45*	148.13*
	10	6.24	6.83	8.45	9.40	10.47	11.68	14.71	16.74	22.94	90.79*	287.10*
	14	7.61	8.45	10.77	12.24	14.00	16.21	23.35	29.98	54.30	245.75*	783.73*
950	8	5.65	6.15	7.50	8.28	9.12	10.03	12.17	13.45	16.71	47.45*	148.13*
	10	6.41	7.03	8.68	9.66	10.74	11.97	15.05	17.08	23.23	90.79*	287.10*
	14	7.83	8.68	11.06	12.56	14.35	16.57	23.67	30.16	54.30	245.75*	783.73*
1000	8	5.80	6.31	7.69	8.49	9.35	10.28	12.46	13.76	17.04	47.47*	148.13*
	10	6.59	7.21	8.91	9.90	11.01	12.26	15.38	17.43	23.53	90.79*	287.10*
	14	8.04	8.92	11.34	12.87	14.69	16.93	24.00	30.36	54.31	245.75*	783.73*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.5 m (RADIUS = 3.9 m)
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	3.01	3.57	6.74	11.11	17.82	27.55	59.90	84.85	159.56	730.43*	2335.9*	
	10	3.44	4.36	11.85	20.42	33.42	52.33	115.33	163.98	309.72	1424.2*	4559.3*	
	14	4.46	7.41	30.33	53.70	89.20	140.92	313.46	446.77	846.37	3903.5*	12505.*	
100	8	3.93	4.58	7.38	11.16	17.82	27.55	59.90	84.85	159.56	730.43*	2335.9*	
	10	4.51	5.51	11.88	20.42	33.42	52.33	115.33	163.98	309.72	1424.2*	4559.3*	
	14	5.80	8.27	30.33	53.70	89.20	140.92	313.46	446.77	846.37	3903.5*	12505.*	
150	8	4.66	5.40	8.20	11.44	17.82	27.55	59.90	84.85	159.56	730.43*	2335.9*	
	10	5.37	6.45	12.16	20.43	33.42	52.33	115.33	163.98	309.72	1424.2*	4559.3*	
	14	6.87	9.28	30.33	53.70	89.20	140.92	313.46	446.77	846.37	3903.5*	12505.*	
200	8	5.30	6.11	8.99	11.95	17.87	27.55	59.90	84.85	159.56	730.43*	2335.9*	
	10	6.11	7.28	12.68	20.44	33.42	52.33	115.33	163.98	309.72	1424.2*	4559.3*	
	14	7.81	10.24	30.33	53.70	89.20	140.92	313.46	446.77	846.37	3903.5*	12505.*	
250	8	5.87	6.74	9.72	12.55	18.01	27.55	59.90	84.85	159.56	730.43*	2335.9*	
	10	6.77	8.02	13.30	20.52	33.42	52.33	115.33	163.98	309.72	1424.2*	4559.3*	
	14	8.65	11.13	30.33	53.70	89.20	140.92	313.46	446.77	846.37	3903.5*	12505.*	
300	8	6.39	7.32	10.41	13.18	18.26	27.56	59.90	84.85	159.56	730.43*	2335.9*	
	10	7.38	8.70	13.96	20.70	33.43	52.33	115.33	163.98	309.72	1424.2*	4559.3*	
	14	9.42	11.96	30.35	53.70	89.20	140.92	313.46	446.77	846.37	3903.5*	12505.*	
350	8	6.88	7.87	11.06	13.80	18.61	27.58	59.90	84.85	159.56	730.43*	2335.9*	
	10	7.95	9.33	14.62	20.97	33.43	52.33	115.33	163.98	309.72	1424.2*	4559.3*	
	14	10.14	12.75	30.39	53.70	89.20	140.92	313.46	446.77	846.37	3903.5*	12505.*	
400	8	7.34	8.38	11.67	14.41	19.02	27.64	59.90	84.85	159.56	730.43*	2335.9*	
	10	8.49	9.93	15.26	21.32	33.45	52.33	115.33	163.98	309.72	1424.2*	4559.3*	
	14	10.81	13.49	30.47	53.70	89.20	140.92	313.46	446.77	846.37	3903.5*	12505.*	
450	8	7.78	8.86	12.26	15.01	19.48	27.75	59.90	84.85	159.56	730.43*	2335.9*	
	10	9.00	10.49	15.89	21.72	33.48	52.33	115.33	163.98	309.72	1424.2*	4559.3*	
	14	11.45	14.19	30.61	53.70	89.20	140.92	313.46	446.77	846.37	3903.5*	12505.*	
500	8	8.20	9.32	12.82	15.59	19.95	27.90	59.90	84.85	159.56	730.43*	2335.9*	
	10	9.49	11.03	16.51	22.17	33.54	52.33	115.33	163.98	309.72	1424.2*	4559.3*	
	14	12.07	14.87	30.80	53.70	89.20	140.92	313.46	446.77	846.37	3903.5*	12505.*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 5.5 m (RADIUS = 3.9 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	8.60	9.77	13.36	16.15	20.44	28.10	59.90	84.85	159.56	730.43*	2335.9*	
	10	9.95	11.55	17.10	22.65	33.64	52.33	115.33	163.98	309.72	1424.2*	4559.3*	
	14	12.65	15.52	31.05	53.70	89.20	140.92	313.46	446.77	846.37	3903.5*	12505.*	
600	8	8.99	10.19	13.88	16.69	20.94	28.34	59.90	84.85	159.56	730.43*	2335.9*	
	10	10.40	12.05	17.68	23.14	33.77	52.34	115.33	163.98	309.72	1424.2*	4559.3*	
	14	13.22	16.14	31.35	53.71	89.20	140.92	313.46	446.77	846.37	3903.5*	12505.*	
650	8	9.36	10.60	14.38	17.22	21.43	28.62	59.90	84.85	159.56	730.43*	2335.9*	
	10	10.83	12.53	18.25	23.63	33.94	52.34	115.33	163.98	309.72	1424.2*	4559.3*	
	14	13.76	16.75	31.69	53.71	89.20	140.92	313.46	446.77	846.37	3903.5*	12505.*	
700	8	9.72	11.00	14.87	17.74	21.93	28.93	59.90	84.85	159.56	730.43*	2335.9*	
	10	11.25	12.99	18.80	24.13	34.14	52.35	115.33	163.98	309.72	1424.2*	4559.3*	
	14	14.29	17.33	32.07	53.73	89.20	140.92	313.46	446.77	846.37	3903.5*	12505.*	
750	8	10.07	11.39	15.34	18.25	22.42	29.26	59.90	84.85	159.56	730.43*	2335.9*	
	10	11.66	13.44	19.33	24.63	34.38	52.36	115.33	163.98	309.72	1424.2*	4559.3*	
	14	14.80	17.90	32.47	53.75	89.20	140.92	313.46	446.77	846.37	3903.5*	12505.*	
800	8	10.41	11.77	15.80	18.74	22.91	29.62	59.90	84.85	159.56	730.43*	2335.9*	
	10	12.05	13.88	19.86	25.13	34.65	52.38	115.33	163.98	309.72	1424.2*	4559.3*	
	14	15.30	18.45	32.89	53.78	89.20	140.92	313.46	446.77	846.37	3903.5*	12505.*	
850	8	10.75	12.13	16.25	19.22	23.39	29.99	59.90	84.85	159.56	730.43*	2335.9*	
	10	12.44	14.31	20.37	25.63	34.95	52.41	115.33	163.98	309.72	1424.2*	4559.3*	
	14	15.78	18.99	33.33	53.82	89.20	140.92	313.46	446.77	846.37	3903.5*	12505.*	
900	8	11.07	12.49	16.68	19.69	23.86	30.37	59.91	84.85	159.56	730.43*	2335.9*	
	10	12.81	14.72	20.87	26.12	35.26	52.44	115.33	163.98	309.72	1424.2*	4559.3*	
	14	16.25	19.51	33.78	53.88	89.20	140.92	313.46	446.77	846.37	3903.5*	12505.*	
950	8	11.39	12.84	17.11	20.15	24.33	30.76	59.92	84.85	159.56	730.43*	2335.9*	
	10	13.18	15.13	21.36	26.61	35.60	52.49	115.33	163.98	309.72	1424.2*	4559.3*	
	14	16.71	20.03	34.24	53.96	89.20	140.92	313.46	446.77	846.37	3903.5*	12505.*	
1000	8	11.70	13.18	17.53	20.60	24.79	31.16	59.94	84.85	159.56	730.43*	2335.9*	
	10	13.54	15.53	21.84	27.09	35.94	52.56	115.33	163.98	309.72	1424.2*	4559.3*	
	14	17.17	20.53	34.70	54.05	89.21	140.92	313.46	446.77	846.37	3903.5*	12505.*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 m (RADIUS = 4.2 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	0.70	0.73	0.85	0.91	0.97	1.04	1.18	1.24	1.38	1.85*	2.44*	
	10	0.73	0.77	0.89	0.96	1.03	1.10	1.25	1.32	1.48	2.03*	2.85*	
	14	0.79	0.83	0.97	1.05	1.13	1.21	1.39	1.48	1.67	2.50*	4.66*	
100	8	0.81	0.85	0.99	1.06	1.14	1.21	1.37	1.45	1.62	2.17*	2.86*	
	10	0.86	0.91	1.05	1.13	1.21	1.30	1.47	1.56	1.75	2.40*	3.30*	
	14	0.95	1.00	1.17	1.27	1.36	1.46	1.67	1.78	2.01	2.95*	4.82*	
150	8	0.90	0.95	1.10	1.18	1.27	1.35	1.53	1.62	1.80	2.43*	3.20*	
	10	0.97	1.02	1.18	1.27	1.37	1.46	1.66	1.76	1.96	2.70*	3.69*	
	14	1.08	1.14	1.33	1.44	1.55	1.66	1.90	2.03	2.29	3.32*	5.15*	
200	8	0.98	1.03	1.20	1.29	1.38	1.47	1.67	1.76	1.96	2.65*	3.49*	
	10	1.06	1.11	1.29	1.39	1.50	1.60	1.81	1.92	2.15	2.96*	4.03*	
	14	1.19	1.26	1.47	1.59	1.71	1.84	2.10	2.24	2.52	3.65*	5.50*	
250	8	1.06	1.11	1.29	1.38	1.48	1.58	1.79	1.90	2.11	2.85*	3.76*	
	10	1.14	1.20	1.40	1.50	1.61	1.73	1.96	2.08	2.32	3.19*	4.33*	
	14	1.30	1.37	1.60	1.73	1.86	1.99	2.28	2.43	2.74	3.94*	5.84*	
300	8	1.12	1.18	1.37	1.47	1.58	1.68	1.90	2.02	2.24	3.03*	4.00*	
	10	1.22	1.28	1.49	1.61	1.72	1.84	2.09	2.22	2.47	3.41*	4.61*	
	14	1.39	1.47	1.72	1.85	1.99	2.14	2.44	2.60	2.93	4.21*	6.17*	
350	8	1.18	1.25	1.45	1.55	1.67	1.78	2.01	2.13	2.37	3.20*	4.22*	
	10	1.29	1.36	1.58	1.70	1.82	1.95	2.21	2.35	2.62	3.61*	4.87*	
	14	1.48	1.56	1.83	1.97	2.12	2.27	2.59	2.76	3.11	4.46*	6.49*	
400	8	1.24	1.31	1.52	1.63	1.75	1.87	2.11	2.23	2.48	3.37*	4.43*	
	10	1.36	1.43	1.66	1.79	1.92	2.05	2.33	2.47	2.76	3.79*	5.12*	
	14	1.56	1.65	1.93	2.08	2.24	2.40	2.74	2.91	3.28	4.69*	6.79*	
450	8	1.30	1.37	1.59	1.71	1.83	1.95	2.21	2.33	2.60	3.52*	4.63*	
	10	1.42	1.50	1.74	1.87	2.01	2.15	2.44	2.58	2.88	3.97*	5.36*	
	14	1.64	1.74	2.03	2.19	2.35	2.52	2.88	3.06	3.44	4.92*	7.08*	
500	8	1.35	1.43	1.65	1.78	1.90	2.03	2.30	2.43	2.70	3.66*	4.83*	
	10	1.48	1.56	1.82	1.96	2.10	2.24	2.54	2.69	3.01	4.14*	5.58*	
	14	1.71	1.82	2.12	2.29	2.46	2.64	3.01	3.20	3.60	5.13*	7.35*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 m (RADIUS = 4.2 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	1.40	1.48	1.72	1.84	1.98	2.11	2.38	2.52	2.81	3.80*	5.01*
	10	1.54	1.63	1.89	2.03	2.18	2.33	2.64	2.80	3.13	4.30*	5.79*
	14	1.79	1.89	2.21	2.38	2.56	2.75	3.13	3.33	3.75	5.34*	7.62*
600	8	1.45	1.53	1.78	1.91	2.05	2.18	2.47	2.61	2.90	3.94*	5.19*
	10	1.60	1.69	1.96	2.11	2.26	2.42	2.74	2.90	3.24	4.46*	6.00*
	14	1.86	1.97	2.29	2.47	2.66	2.85	3.25	3.46	3.89	5.53*	7.87*
650	8	1.50	1.58	1.83	1.97	2.11	2.26	2.55	2.70	3.00	4.07*	5.36*
	10	1.65	1.75	2.03	2.18	2.34	2.50	2.83	3.00	3.35	4.61*	6.20*
	14	1.92	2.04	2.38	2.56	2.76	2.96	3.37	3.58	4.03	5.72*	8.12*
700	8	1.55	1.63	1.89	2.03	2.18	2.33	2.63	2.78	3.09	4.19*	5.52*
	10	1.70	1.80	2.09	2.25	2.41	2.58	2.92	3.10	3.46	4.76*	6.39*
	14	1.99	2.11	2.46	2.65	2.85	3.06	3.48	3.70	4.16	5.91*	8.36*
750	8	1.59	1.68	1.95	2.09	2.24	2.39	2.70	2.86	3.18	4.31*	5.68*
	10	1.76	1.86	2.16	2.32	2.49	2.66	3.01	3.19	3.56	4.90*	6.58*
	14	2.05	2.18	2.54	2.74	2.94	3.15	3.59	3.82	4.29	6.09*	8.60*
800	8	1.64	1.73	2.00	2.15	2.30	2.46	2.78	2.94	3.27	4.43*	5.84*
	10	1.81	1.91	2.22	2.39	2.56	2.74	3.10	3.28	3.66	5.03*	6.76*
	14	2.11	2.24	2.61	2.82	3.03	3.25	3.70	3.93	4.42	6.26*	8.82*
850	8	1.68	1.77	2.05	2.21	2.36	2.52	2.85	3.02	3.35	4.55*	5.99*
	10	1.86	1.96	2.28	2.45	2.63	2.81	3.18	3.37	3.76	5.17*	6.94*
	14	2.17	2.31	2.69	2.90	3.11	3.34	3.80	4.04	4.54	6.43*	9.05*
900	8	1.72	1.82	2.10	2.26	2.42	2.59	2.92	3.09	3.44	4.66*	6.14*
	10	1.90	2.01	2.34	2.51	2.70	2.88	3.26	3.46	3.86	5.30*	7.11*
	14	2.23	2.37	2.76	2.98	3.20	3.43	3.90	4.15	4.66	6.59*	9.26*
950	8	1.76	1.86	2.15	2.32	2.48	2.65	2.99	3.16	3.52	4.77*	6.28*
	10	1.95	2.06	2.39	2.58	2.76	2.95	3.34	3.54	3.95	5.43*	7.28*
	14	2.29	2.43	2.83	3.05	3.28	3.52	4.00	4.25	4.78	6.76*	9.47*
1000	8	1.80	1.90	2.20	2.37	2.54	2.71	3.06	3.24	3.60	4.88*	6.42*
	10	2.00	2.11	2.45	2.64	2.83	3.02	3.42	3.62	4.04	5.55*	7.44*
	14	2.35	2.49	2.90	3.13	3.36	3.60	4.10	4.36	4.89	6.91*	9.68*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 m (RADIUS = 4.2 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1 2 4 5 6 7 9 10 12 18 24											
		(m*s) ^{1/2}	1	2	4	5	6	7	9	10	12	18	24
50	8		1.08	1.15	1.34	1.46	1.58	1.70	1.97	2.12	2.46	4.65*	11.63*
	10		1.16	1.23	1.45	1.58	1.72	1.87	2.20	2.40	2.92	7.60*	21.00*
	14		1.29	1.38	1.66	1.83	2.02	2.24	2.84	3.29	4.93	18.25*	54.51*
100	8		1.31	1.39	1.64	1.77	1.92	2.07	2.39	2.57	2.96	4.97*	11.63*
	10		1.42	1.51	1.79	1.95	2.11	2.29	2.69	2.92	3.46	7.62*	21.00*
	14		1.62	1.73	2.09	2.29	2.52	2.78	3.42	3.85	5.16	18.25*	54.51*
150	8		1.50	1.59	1.87	2.03	2.19	2.36	2.73	2.92	3.36	5.41*	11.63*
	10		1.63	1.74	2.06	2.24	2.43	2.64	3.09	3.34	3.92	7.74*	21.00*
	14		1.88	2.02	2.42	2.66	2.92	3.21	3.91	4.34	5.58	18.25*	54.51*
200	8		1.66	1.76	2.07	2.25	2.43	2.61	3.02	3.23	3.70	5.84*	11.67*
	10		1.82	1.94	2.29	2.49	2.71	2.93	3.42	3.70	4.32	8.00*	21.00*
	14		2.11	2.27	2.72	2.98	3.27	3.59	4.33	4.79	6.01	18.25*	54.51*
250	8		1.81	1.92	2.26	2.44	2.64	2.84	3.28	3.51	4.01	6.24*	11.77*
	10		1.99	2.12	2.51	2.72	2.95	3.20	3.73	4.02	4.69	8.32*	21.00*
	14		2.32	2.49	2.98	3.27	3.58	3.92	4.72	5.19	6.42	18.25*	54.51*
300	8		1.94	2.06	2.42	2.63	2.84	3.05	3.52	3.77	4.30	6.62*	11.94*
	10		2.14	2.29	2.70	2.93	3.18	3.44	4.01	4.32	5.02	8.67*	21.01*
	14		2.51	2.69	3.23	3.54	3.87	4.23	5.07	5.56	6.82	18.26*	54.51*
350	8		2.07	2.20	2.58	2.80	3.02	3.25	3.74	4.00	4.57	6.98*	12.17*
	10		2.29	2.44	2.88	3.13	3.39	3.67	4.27	4.60	5.33	9.03*	21.01*
	14		2.69	2.89	3.45	3.78	4.13	4.52	5.40	5.91	7.19	18.27*	54.51*
400	8		2.19	2.33	2.73	2.96	3.19	3.43	3.95	4.23	4.82	7.32*	12.44*
	10		2.42	2.59	3.05	3.32	3.59	3.88	4.52	4.86	5.62	9.38*	21.02*
	14		2.86	3.07	3.67	4.01	4.39	4.79	5.71	6.24	7.55	18.30*	54.51*
450	8		2.30	2.45	2.87	3.11	3.35	3.61	4.15	4.44	5.06	7.65*	12.73*
	10		2.55	2.72	3.22	3.49	3.78	4.09	4.75	5.11	5.90	9.72*	21.05*
	14		3.02	3.24	3.87	4.23	4.62	5.04	6.00	6.55	7.89	18.36*	54.51*
500	8		2.41	2.56	3.01	3.25	3.51	3.78	4.34	4.64	5.28	7.96*	13.03*
	10		2.68	2.86	3.37	3.66	3.96	4.28	4.97	5.34	6.17	10.06*	21.09*
	14		3.17	3.40	4.06	4.44	4.85	5.29	6.28	6.85	8.22	18.45*	54.51*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 m (RADIUS = 4.2 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550 (m*s) ^{1/2}	8	2.51	2.67	3.13	3.39	3.66	3.94	4.53	4.84	5.50	8.26*	13.34*
	10	2.80	2.98	3.52	3.82	4.14	4.47	5.18	5.57	6.42	10.39*	21.16*
	14	3.32	3.56	4.25	4.64	5.07	5.52	6.55	7.14	8.54	18.56*	54.51*
600	8	2.61	2.78	3.26	3.53	3.80	4.09	4.70	5.02	5.71	8.54*	13.65*
	10	2.91	3.11	3.66	3.98	4.30	4.65	5.39	5.79	6.66	10.71*	21.26*
	14	3.46	3.71	4.43	4.84	5.28	5.75	6.81	7.41	8.84	18.70*	54.51*
650	8	2.71	2.88	3.38	3.66	3.94	4.24	4.87	5.20	5.91	8.82*	13.96*
	10	3.02	3.23	3.80	4.13	4.47	4.82	5.59	6.00	6.90	11.02*	21.37*
	14	3.59	3.86	4.60	5.03	5.48	5.97	7.06	7.68	9.14	18.87*	54.51*
700	8	2.80	2.98	3.50	3.78	4.08	4.39	5.04	5.38	6.11	9.09*	14.26*
	10	3.13	3.34	3.94	4.27	4.62	4.99	5.78	6.20	7.13	11.32*	21.51*
	14	3.73	4.00	4.77	5.21	5.68	6.18	7.30	7.93	9.42	19.06*	54.51*
750	8	2.89	3.08	3.61	3.90	4.21	4.53	5.20	5.55	6.30	9.35*	14.57*
	10	3.23	3.45	4.07	4.41	4.77	5.15	5.96	6.40	7.35	11.62*	21.67*
	14	3.85	4.14	4.93	5.38	5.87	6.38	7.53	8.18	9.70	19.26*	54.51*
800	8	2.98	3.17	3.72	4.02	4.34	4.66	5.35	5.71	6.48	9.61*	14.87*
	10	3.34	3.56	4.20	4.55	4.92	5.31	6.14	6.59	7.57	11.91*	21.85*
	14	3.98	4.27	5.09	5.55	6.05	6.58	7.76	8.43	9.97	19.48*	54.51*
850	8	3.07	3.27	3.83	4.14	4.46	4.80	5.50	5.87	6.66	9.86*	15.17*
	10	3.44	3.67	4.32	4.68	5.07	5.46	6.32	6.78	7.78	12.19*	22.05*
	14	4.10	4.40	5.24	5.72	6.23	6.77	7.98	8.66	10.24	19.71*	54.51*
900	8	3.15	3.36	3.93	4.25	4.58	4.93	5.65	6.03	6.84	10.10*	15.46*
	10	3.53	3.77	4.44	4.81	5.21	5.61	6.49	6.96	7.98	12.47*	22.25*
	14	4.22	4.53	5.39	5.88	6.41	6.96	8.20	8.89	10.49	19.94*	54.51*
950	8	3.24	3.44	4.03	4.36	4.70	5.05	5.79	6.18	7.01	10.34*	15.75*
	10	3.63	3.87	4.56	4.94	5.34	5.76	6.66	7.14	8.18	12.74*	22.47*
	14	4.34	4.66	5.54	6.04	6.58	7.15	8.41	9.12	10.74	20.18*	54.51*
1000	8	3.32	3.53	4.13	4.47	4.82	5.18	5.93	6.33	7.18	10.57*	16.04*
	10	3.72	3.97	4.67	5.07	5.48	5.91	6.82	7.31	8.38	13.00*	22.69*
	14	4.45	4.78	5.68	6.20	6.75	7.33	8.62	9.34	10.99	20.43*	54.51*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 m (RADIUS = 4.2 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	1.80	1.94	2.41	2.71	3.09	3.60	5.59	7.39	12.72	52.00*	159.76*	
	10	1.96	2.15	2.77	3.22	3.90	5.05	9.59	13.08	23.36	99.68*	309.78*	
	14	2.29	2.59	3.77	5.15	7.73	11.54	23.97	33.42	61.39	270.09*	845.91*	
100	8	2.27	2.46	3.03	3.39	3.81	4.33	5.98	7.50	12.72	52.00*	159.76*	
	10	2.51	2.75	3.49	3.99	4.65	5.60	9.60	13.08	23.36	99.68*	309.78*	
	14	2.98	3.35	4.62	5.76	7.86	11.54	23.97	33.42	61.39	270.09*	845.91*	
150	8	2.65	2.87	3.53	3.93	4.40	4.95	6.55	7.85	12.73	52.00*	159.76*	
	10	2.96	3.23	4.07	4.62	5.31	6.23	9.74	13.09	23.36	99.68*	309.78*	
	14	3.53	3.95	5.33	6.45	8.28	11.60	23.97	33.42	61.39	270.09*	845.91*	
200	8	2.99	3.24	3.96	4.40	4.91	5.49	7.10	8.33	12.80	52.00*	159.76*	
	10	3.34	3.65	4.58	5.17	5.90	6.82	10.05	13.15	23.36	99.68*	309.78*	
	14	4.01	4.48	5.96	7.10	8.81	11.79	23.97	33.42	61.39	270.09*	845.91*	
250	8	3.29	3.56	4.35	4.82	5.36	5.98	7.63	8.82	12.95	52.00*	159.76*	
	10	3.69	4.03	5.03	5.66	6.42	7.37	10.45	13.31	23.36	99.68*	309.78*	
	14	4.44	4.95	6.53	7.70	9.37	12.11	23.97	33.42	61.39	270.09*	845.91*	
300	8	3.56	3.86	4.70	5.21	5.78	6.44	8.13	9.30	13.20	52.00*	159.76*	
	10	4.01	4.37	5.44	6.12	6.91	7.89	10.90	13.56	23.37	99.68*	309.78*	
	14	4.84	5.39	7.05	8.25	9.91	12.51	23.97	33.42	61.39	270.09*	845.91*	
350	8	3.82	4.14	5.04	5.57	6.18	6.86	8.59	9.77	13.50	52.00*	159.76*	
	10	4.30	4.70	5.83	6.54	7.37	8.37	11.35	13.88	23.38	99.68*	309.78*	
	14	5.21	5.79	7.54	8.77	10.44	12.95	23.99	33.42	61.39	270.09*	845.91*	
400	8	4.06	4.40	5.35	5.91	6.54	7.25	9.04	10.22	13.85	52.00*	159.76*	
	10	4.58	5.00	6.20	6.94	7.80	8.83	11.81	14.23	23.40	99.68*	309.78*	
	14	5.56	6.17	8.00	9.27	10.95	13.40	24.02	33.42	61.39	270.09*	845.91*	
450	8	4.30	4.65	5.65	6.24	6.89	7.63	9.46	10.66	14.21	52.00*	159.76*	
	10	4.85	5.29	6.54	7.31	8.20	9.26	12.25	14.61	23.45	99.68*	309.78*	
	14	5.89	6.53	8.44	9.74	11.44	13.86	24.08	33.42	61.39	270.09*	845.91*	
500	8	4.52	4.88	5.93	6.54	7.23	7.99	9.87	11.08	14.59	52.00*	159.76*	
	10	5.10	5.56	6.87	7.67	8.59	9.68	12.69	15.00	23.52	99.68*	309.78*	
	14	6.21	6.88	8.85	10.19	11.91	14.31	24.17	33.43	61.39	270.09*	845.91*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 m (RADIUS = 4.2 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	4.73	5.11	6.20	6.84	7.55	8.34	10.26	11.49	14.97	52.00*	159.76*	
	10	5.35	5.83	7.19	8.02	8.97	10.08	13.12	15.39	23.63	99.68*	309.78*	
	14	6.51	7.21	9.25	10.62	12.37	14.76	24.30	33.44	61.39	270.09*	845.91*	
600	8	4.93	5.33	6.46	7.12	7.85	8.67	10.64	11.88	15.35	52.00*	159.76*	
	10	5.58	6.08	7.49	8.35	9.33	10.46	13.53	15.79	23.77	99.68*	309.78*	
	14	6.80	7.53	9.64	11.04	12.81	15.20	24.46	33.46	61.39	270.09*	845.91*	
650	8	5.13	5.55	6.71	7.40	8.15	8.99	11.00	12.26	15.72	52.00*	159.76*	
	10	5.81	6.33	7.78	8.67	9.67	10.84	13.94	16.18	23.95	99.68*	309.78*	
	14	7.09	7.84	10.01	11.44	13.24	15.63	24.66	33.49	61.39	270.09*	845.91*	
700	8	5.32	5.75	6.96	7.66	8.44	9.30	11.35	12.63	16.10	52.00*	159.76*	
	10	6.03	6.57	8.07	8.98	10.01	11.20	14.33	16.56	24.14	99.68*	309.78*	
	14	7.36	8.13	10.36	11.83	13.66	16.05	24.88	33.53	61.39	270.09*	845.91*	
750	8	5.51	5.95	7.19	7.92	8.72	9.60	11.70	12.99	16.46	52.00*	159.76*	
	10	6.24	6.80	8.34	9.28	10.33	11.55	14.72	16.95	24.36	99.68*	309.78*	
	14	7.63	8.42	10.71	12.21	14.06	16.47	25.13	33.59	61.39	270.09*	845.91*	
800	8	5.69	6.14	7.42	8.17	8.99	9.89	12.03	13.34	16.83	52.00*	159.76*	
	10	6.45	7.02	8.61	9.57	10.65	11.89	15.10	17.33	24.60	99.68*	309.78*	
	14	7.88	8.70	11.05	12.58	14.45	16.88	25.39	33.67	61.39	270.09*	845.91*	
850	8	5.86	6.33	7.65	8.41	9.25	10.17	12.36	13.69	17.19	52.00*	159.76*	
	10	6.66	7.24	8.87	9.85	10.96	12.22	15.47	17.70	24.86	99.68*	309.78*	
	14	8.14	8.98	11.38	12.94	14.84	17.28	25.67	33.77	61.39	270.09*	845.91*	
900	8	6.03	6.52	7.87	8.65	9.51	10.45	12.67	14.02	17.54	52.00*	159.76*	
	10	6.85	7.45	9.13	10.13	11.26	12.54	15.83	18.06	25.13	99.68*	309.78*	
	14	8.38	9.24	11.70	13.29	15.21	17.67	25.97	33.89	61.39	270.09*	845.91*	
950	8	6.20	6.70	8.08	8.89	9.76	10.72	12.98	14.35	17.89	52.01*	159.76*	
	10	7.05	7.66	9.38	10.40	11.55	12.86	16.18	18.42	25.40	99.68*	309.78*	
	14	8.62	9.50	12.02	13.63	15.58	18.05	26.27	34.02	61.39	270.09*	845.91*	
1000	8	6.37	6.88	8.29	9.11	10.01	10.99	13.29	14.67	18.23	52.01*	159.76*	
	10	7.24	7.87	9.62	10.67	11.84	13.17	16.53	18.78	25.69	99.68*	309.78*	
	14	8.86	9.76	12.32	13.96	15.94	18.43	26.58	34.17	61.39	270.09*	845.91*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 m (RADIUS = 4.2 m)
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		(m*s) ^{1/2}											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	3.33	3.96	8.07	13.33	21.18	32.45	69.31	97.41	180.66	803.06*	2521.4*	
	10	3.83	4.96	14.49	24.70	39.95	61.86	133.68	188.47	350.90	1566.0*	4921.8*	
	14	5.09	9.31	37.50	65.35	107.03	166.97	363.71	513.89	959.28	4292.6*	13500.*	
100	8	4.34	5.07	8.52	13.34	21.18	32.45	69.31	97.41	180.66	803.06*	2521.4*	
	10	5.02	6.19	14.50	24.70	39.95	61.86	133.68	188.47	350.90	1566.0*	4921.8*	
	14	6.55	9.87	37.50	65.35	107.03	166.97	363.71	513.89	959.28	4292.6*	13500.*	
150	8	5.15	5.96	9.29	13.48	21.18	32.45	69.31	97.41	180.66	803.06*	2521.4*	
	10	5.96	7.21	14.62	24.70	39.95	61.86	133.68	188.47	350.90	1566.0*	4921.8*	
	14	7.74	10.82	37.50	65.35	107.03	166.97	363.71	513.89	959.28	4292.6*	13500.*	
200	8	5.85	6.74	10.08	13.84	21.20	32.45	69.31	97.41	180.66	803.06*	2521.4*	
	10	6.78	8.11	14.96	24.71	39.95	61.86	133.68	188.47	350.90	1566.0*	4921.8*	
	14	8.77	11.80	37.50	65.35	107.03	166.97	363.71	513.89	959.28	4292.6*	13500.*	
250	8	6.48	7.43	10.85	14.36	21.25	32.45	69.31	97.41	180.66	803.06*	2521.4*	
	10	7.52	8.92	15.47	24.73	39.95	61.86	133.68	188.47	350.90	1566.0*	4921.8*	
	14	9.70	12.73	37.50	65.35	107.03	166.97	363.71	513.89	959.28	4292.6*	13500.*	
300	8	7.06	8.07	11.57	14.94	21.39	32.45	69.31	97.41	180.66	803.06*	2521.4*	
	10	8.19	9.66	16.06	24.80	39.95	61.86	133.68	188.47	350.90	1566.0*	4921.8*	
	14	10.55	13.62	37.50	65.35	107.03	166.97	363.71	513.89	959.28	4292.6*	13500.*	
350	8	7.60	8.66	12.26	15.55	21.62	32.46	69.31	97.41	180.66	803.06*	2521.4*	
	10	8.82	10.35	16.69	24.94	39.95	61.86	133.68	188.47	350.90	1566.0*	4921.8*	
	14	11.34	14.46	37.51	65.35	107.03	166.97	363.71	513.89	959.28	4292.6*	13500.*	
400	8	8.11	9.22	12.92	16.16	21.93	32.48	69.31	97.41	180.66	803.06*	2521.4*	
	10	9.41	11.00	17.33	25.16	39.96	61.86	133.68	188.47	350.90	1566.0*	4921.8*	
	14	12.09	15.25	37.53	65.35	107.03	166.97	363.71	513.89	959.28	4292.6*	13500.*	
450	8	8.60	9.75	13.54	16.77	22.30	32.52	69.31	97.41	180.66	803.06*	2521.4*	
	10	9.97	11.62	17.97	25.45	39.97	61.86	133.68	188.47	350.90	1566.0*	4921.8*	
	14	12.80	16.02	37.57	65.35	107.03	166.97	363.71	513.89	959.28	4292.6*	13500.*	
500	8	9.06	10.26	14.14	17.36	22.72	32.59	69.31	97.41	180.66	803.06*	2521.4*	
	10	10.51	12.21	18.60	25.80	39.99	61.86	133.68	188.47	350.90	1566.0*	4921.8*	
	14	13.47	16.75	37.65	65.35	107.03	166.97	363.71	513.89	959.28	4292.6*	13500.*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 m (RADIUS = 4.2 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	9.50	10.75	14.72	17.95	23.17	32.70	69.31	97.41	180.66	803.06*	2521.4*	
	10	11.03	12.78	19.22	26.19	40.02	61.86	133.68	188.47	350.90	1566.0*	4921.8*	
	14	14.12	17.46	37.76	65.35	107.03	166.97	363.71	513.89	959.28	4292.6*	13500.*	
600	8	9.92	11.21	15.28	18.52	23.63	32.86	69.31	97.41	180.66	803.06*	2521.4*	
	10	11.52	13.33	19.82	26.62	40.08	61.86	133.68	188.47	350.90	1566.0*	4921.8*	
	14	14.75	18.14	37.92	65.35	107.03	166.97	363.71	513.89	959.28	4292.6*	13500.*	
650	8	10.34	11.66	15.82	19.07	24.11	33.05	69.31	97.41	180.66	803.06*	2521.4*	
	10	12.00	13.85	20.42	27.07	40.16	61.86	133.68	188.47	350.90	1566.0*	4921.8*	
	14	15.35	18.79	38.13	65.35	107.03	166.97	363.71	513.89	959.28	4292.6*	13500.*	
700	8	10.73	12.10	16.34	19.62	24.60	33.27	69.31	97.41	180.66	803.06*	2521.4*	
	10	12.46	14.36	20.99	27.54	40.27	61.86	133.68	188.47	350.90	1566.0*	4921.8*	
	14	15.93	19.43	38.38	65.36	107.03	166.97	363.71	513.89	959.28	4292.6*	13500.*	
750	8	11.12	12.52	16.85	20.15	25.08	33.53	69.31	97.41	180.66	803.06*	2521.4*	
	10	12.91	14.85	21.56	28.02	40.41	61.86	133.68	188.47	350.90	1566.0*	4921.8*	
	14	16.50	20.05	38.66	65.36	107.03	166.97	363.71	513.89	959.28	4292.6*	13500.*	
800	8	11.50	12.93	17.34	20.67	25.57	33.82	69.31	97.41	180.66	803.06*	2521.4*	
	10	13.35	15.33	22.12	28.50	40.58	61.87	133.68	188.47	350.90	1566.0*	4921.8*	
	14	17.05	20.65	38.98	65.37	107.03	166.97	363.71	513.89	959.28	4292.6*	13500.*	
850	8	11.86	13.33	17.83	21.18	26.06	34.13	69.31	97.41	180.66	803.06*	2521.4*	
	10	13.77	15.80	22.66	28.99	40.78	61.88	133.68	188.47	350.90	1566.0*	4921.8*	
	14	17.58	21.24	39.33	65.38	107.03	166.97	363.71	513.89	959.28	4292.6*	13500.*	
900	8	12.22	13.73	18.30	21.68	26.54	34.46	69.31	97.41	180.66	803.06*	2521.4*	
	10	14.19	16.26	23.19	29.48	41.01	61.89	133.68	188.47	350.90	1566.0*	4921.8*	
	14	18.10	21.81	39.70	65.39	107.03	166.97	363.71	513.89	959.28	4292.6*	13500.*	
950	8	12.57	14.11	18.76	22.17	27.02	34.81	69.32	97.41	180.66	803.06*	2521.4*	
	10	14.59	16.70	23.71	29.97	41.27	61.91	133.68	188.47	350.90	1566.0*	4921.8*	
	14	18.61	22.38	40.09	65.42	107.03	166.97	363.71	513.89	959.28	4292.6*	13500.*	
1000	8	12.91	14.48	19.21	22.65	27.49	35.17	69.32	97.41	180.66	803.06*	2521.4*	
	10	14.99	17.14	24.23	30.46	41.54	61.93	133.68	188.47	350.90	1566.0*	4921.8*	
	14	19.11	22.92	40.49	65.45	107.03	166.97	363.71	513.89	959.28	4292.6*	13500.*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.5 m (RADIUS = 4.6 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	0.75	0.78	0.89	0.95	1.02	1.08	1.22	1.29	1.43	1.90*	2.50*
	10	0.79	0.82	0.94	1.01	1.08	1.15	1.29	1.37	1.53	2.08*	2.93*
	14	0.85	0.89	1.03	1.10	1.18	1.27	1.44	1.54	1.74	2.60*	4.93*
100	8	0.87	0.91	1.04	1.11	1.19	1.27	1.43	1.51	1.67	2.22*	2.92*
	10	0.93	0.97	1.11	1.19	1.27	1.36	1.53	1.62	1.81	2.46*	3.39*
	14	1.03	1.08	1.24	1.33	1.43	1.53	1.75	1.86	2.10	3.05*	5.06*
150	8	0.97	1.01	1.16	1.24	1.33	1.42	1.59	1.68	1.87	2.49*	3.27*
	10	1.04	1.09	1.25	1.34	1.43	1.53	1.73	1.83	2.04	2.77*	3.78*
	14	1.17	1.22	1.41	1.52	1.63	1.75	1.99	2.11	2.38	3.43*	5.36*
200	8	1.06	1.11	1.27	1.36	1.45	1.54	1.74	1.84	2.04	2.71*	3.57*
	10	1.14	1.19	1.37	1.47	1.57	1.68	1.89	2.01	2.23	3.04*	4.12*
	14	1.29	1.35	1.56	1.68	1.80	1.93	2.20	2.34	2.63	3.76*	5.70*
250	8	1.14	1.19	1.36	1.46	1.56	1.66	1.87	1.97	2.19	2.92*	3.84*
	10	1.23	1.29	1.48	1.59	1.70	1.81	2.05	2.16	2.41	3.28*	4.44*
	14	1.40	1.47	1.70	1.83	1.96	2.10	2.39	2.54	2.85	4.06*	6.05*
300	8	1.21	1.27	1.45	1.55	1.66	1.77	1.99	2.10	2.33	3.11*	4.08*
	10	1.32	1.38	1.58	1.70	1.81	1.93	2.18	2.31	2.57	3.49*	4.72*
	14	1.50	1.58	1.82	1.96	2.10	2.25	2.56	2.72	3.06	4.33*	6.38*
350	8	1.28	1.34	1.53	1.64	1.75	1.87	2.10	2.22	2.46	3.28*	4.31*
	10	1.39	1.46	1.68	1.80	1.92	2.05	2.31	2.45	2.73	3.70*	4.99*
	14	1.60	1.68	1.94	2.09	2.24	2.39	2.72	2.89	3.25	4.59*	6.69*
400	8	1.34	1.41	1.61	1.72	1.84	1.96	2.20	2.33	2.58	3.45*	4.53*
	10	1.47	1.54	1.77	1.89	2.02	2.16	2.43	2.58	2.87	3.89*	5.24*
	14	1.69	1.78	2.05	2.20	2.36	2.53	2.87	3.05	3.43	4.83*	7.00*
450	8	1.41	1.47	1.68	1.80	1.92	2.05	2.30	2.43	2.70	3.60*	4.73*
	10	1.54	1.61	1.85	1.98	2.12	2.26	2.55	2.70	3.00	4.07*	5.48*
	14	1.78	1.87	2.16	2.32	2.48	2.66	3.02	3.20	3.60	5.06*	7.29*
500	8	1.46	1.53	1.75	1.88	2.00	2.13	2.40	2.54	2.81	3.75*	4.93*
	10	1.60	1.68	1.93	2.07	2.21	2.36	2.66	2.82	3.13	4.25*	5.71*
	14	1.86	1.95	2.26	2.42	2.60	2.78	3.15	3.35	3.76	5.28*	7.57*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.5 m (RADIUS = 4.6 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}	°C/min											
	8	1.52	1.59	1.82	1.95	2.08	2.22	2.49	2.63	2.92	3.90*	5.12*
	10	1.67	1.75	2.01	2.15	2.30	2.45	2.77	2.93	3.26	4.41*	5.93*
	14	1.94	2.04	2.35	2.53	2.71	2.90	3.29	3.49	3.92	5.49*	7.84*
550	8	1.57	1.65	1.89	2.02	2.16	2.30	2.58	2.73	3.02	4.03*	5.30*
	10	1.73	1.81	2.08	2.23	2.39	2.54	2.87	3.04	3.38	4.57*	6.14*
	14	2.01	2.12	2.44	2.63	2.81	3.01	3.41	3.62	4.07	5.69*	8.10*
600	8	1.63	1.70	1.95	2.09	2.23	2.37	2.67	2.82	3.12	4.17*	5.47*
	10	1.79	1.88	2.16	2.31	2.47	2.63	2.97	3.14	3.49	4.73*	6.34*
	14	2.09	2.20	2.53	2.72	2.92	3.12	3.54	3.75	4.21	5.89*	8.35*
650	8	1.68	1.76	2.01	2.15	2.30	2.45	2.75	2.90	3.22	4.29*	5.64*
	10	1.85	1.94	2.23	2.38	2.55	2.72	3.06	3.24	3.61	4.88*	6.54*
	14	2.16	2.27	2.62	2.81	3.02	3.22	3.66	3.88	4.35	6.08*	8.60*
700	8	1.73	1.81	2.07	2.21	2.36	2.52	2.83	2.99	3.31	4.42*	5.80*
	10	1.90	2.00	2.29	2.46	2.63	2.80	3.16	3.34	3.71	5.02*	6.73*
	14	2.23	2.34	2.70	2.90	3.11	3.33	3.77	4.00	4.49	6.26*	8.84*
750	8	1.77	1.86	2.13	2.28	2.43	2.59	2.91	3.07	3.40	4.54*	5.96*
	10	1.96	2.06	2.36	2.53	2.70	2.88	3.25	3.43	3.82	5.16*	6.92*
	14	2.29	2.41	2.78	2.99	3.20	3.43	3.88	4.12	4.62	6.44*	9.07*
800	8	1.82	1.91	2.18	2.34	2.49	2.66	2.98	3.15	3.49	4.66*	6.12*
	10	2.01	2.11	2.42	2.60	2.78	2.96	3.33	3.53	3.92	5.30*	7.10*
	14	2.36	2.48	2.86	3.08	3.30	3.52	3.99	4.24	4.75	6.61*	9.30*
850	8	1.87	1.95	2.24	2.40	2.56	2.72	3.06	3.23	3.58	4.78*	6.27*
	10	2.06	2.17	2.49	2.66	2.85	3.04	3.42	3.62	4.02	5.44*	7.27*
	14	2.42	2.55	2.94	3.16	3.38	3.62	4.10	4.35	4.87	6.78*	9.52*
900	8	1.91	2.00	2.29	2.45	2.62	2.79	3.13	3.31	3.67	4.89*	6.42*
	10	2.12	2.22	2.55	2.73	2.92	3.11	3.50	3.71	4.12	5.57*	7.45*
	14	2.49	2.62	3.02	3.24	3.47	3.71	4.20	4.46	5.00	6.95*	9.73*
950	8	1.95	2.05	2.34	2.51	2.68	2.85	3.20	3.38	3.75	5.00*	6.56*
	10	2.17	2.27	2.61	2.80	2.99	3.18	3.59	3.79	4.22	5.70*	7.61*
	14	2.55	2.68	3.09	3.32	3.56	3.80	4.31	4.57	5.12	7.11*	9.94*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.5 m (RADIUS = 4.6 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX
RATE OF RISE

CEILING HEIGHT, m

(m*s)^{1/2}

°C/min

1

2

4

5

6

7

9

10

12

18

24

50

8
10
14

1.17
1.25
1.39

1.22
1.31
1.48

1.42
1.54
1.77

1.54
1.67
1.95

1.66
1.81
2.15

1.78
1.96
2.38

2.06
2.32
3.04

2.21
2.53
3.56

2.57
3.09
5.44

4.96*
8.22*
19.91*

12.42*
22.52*
58.65*

100

8
10
14

1.42
1.54
1.75

1.49
1.62
1.87

1.73
1.90
2.23

1.87
2.06
2.44

2.02
2.23
2.68

2.17
2.42
2.95

2.50
2.83
3.64

2.68
3.07
4.11

3.09
3.65
5.61

5.23*
8.23*
19.91*

12.42*
22.52*
58.65*

150

8
10
14

1.62
1.77
2.04

1.71
1.87
2.18

1.99
2.19
2.59

2.14
2.38
2.84

2.31
2.57
3.11

2.48
2.78
3.41

2.86
3.25
4.15

3.06
3.51
4.62

3.51
4.13
6.00

5.66*
8.31*
19.91*

12.42*
22.52*
58.65*

200

8
10
14

1.80
1.97
2.29

1.90
2.09
2.44

2.20
2.44
2.91

2.38
2.65
3.18

2.56
2.86
3.48

2.75
3.10
3.81

3.17
3.61
4.60

3.39
3.89
5.09

3.87
4.55
6.43

6.08*
8.52*
19.91*

12.44*
22.52*
58.65*

250

8
10
14

1.96
2.16
2.52

2.07
2.28
2.69

2.40
2.67
3.19

2.59
2.89
3.49

2.79
3.13
3.81

3.00
3.38
4.16

3.44
3.93
5.00

3.68
4.23
5.51

4.20
4.93
6.85

6.49*
8.81*
19.91*

12.51*
22.52*
58.65*

300

8
10
14

2.11
2.33
2.73

2.22
2.46
2.91

2.58
2.88
3.45

2.78
3.12
3.77

3.00
3.37
4.11

3.22
3.64
4.49

3.69
4.22
5.37

3.95
4.55
5.90

4.50
5.28
7.26

6.88*
9.14*
19.91*

12.65*
22.53*
58.65*

350

8
10
14

2.24
2.48
2.92

2.37
2.63
3.12

2.75
3.07
3.70

2.97
3.33
4.03

3.19
3.60
4.40

3.43
3.88
4.80

3.93
4.50
5.72

4.20
4.84
6.27

4.78
5.60
7.65

7.24*
9.49*
19.91*

12.84*
22.53*
58.65*

400

8
10
14

2.37
2.63
3.11

2.50
2.79
3.31

2.91
3.26
3.93

3.14
3.53
4.28

3.37
3.81
4.67

3.62
4.11
5.08

4.15
4.76
6.05

4.44
5.11
6.61

5.05
5.91
8.02

7.59*
9.83*
19.93*

13.08*
22.53*
58.65*

450

8
10
14

2.50
2.77
3.28

2.64
2.94
3.50

3.06
3.43
4.14

3.30
3.71
4.52

3.55
4.01
4.92

3.81
4.32
5.36

4.36
5.00
6.36

4.66
5.37
6.94

5.30
6.20
8.37

7.92*
10.18*
19.96*

13.35*
22.55*
58.65*

500

8
10
14

2.62
2.91
3.45

2.76
3.08
3.68

3.20
3.60
4.35

3.45
3.89
4.74

3.71
4.20
5.16

3.99
4.53
5.62

4.57
5.24
6.65

4.87
5.62
7.25

5.53
6.48
8.72

8.24*
10.51*
20.02*

13.63*
22.58*
58.65*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.5 m (RADIUS = 4.6 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE
 TIME INDEX

CEILING HEIGHT, m

(m*s)^{1/2}

RATE
 OF RISE

°C/min

1

2

4

5

6

7

9

10

12

18

24

550	8	2.73	2.88	3.34	3.60	3.87	4.16	4.76	5.08	5.76	8.54*	13.93*
	10	3.04	3.22	3.76	4.06	4.39	4.73	5.46	5.86	6.74	10.84*	22.62*
	14	3.61	3.85	4.55	4.96	5.39	5.86	6.94	7.56	9.05	20.10*	58.65*
600	8	2.84	3.00	3.48	3.75	4.03	4.32	4.94	5.27	5.98	8.84*	14.23*
	10	3.16	3.35	3.91	4.23	4.57	4.92	5.68	6.09	7.00	11.17*	22.69*
	14	3.76	4.01	4.74	5.16	5.62	6.10	7.21	7.84	9.36	20.20*	58.65*
650	8	2.94	3.11	3.60	3.88	4.18	4.48	5.12	5.46	6.19	9.12*	14.54*
	10	3.29	3.48	4.06	4.39	4.74	5.10	5.89	6.31	7.25	11.48*	22.78*
	14	3.91	4.17	4.93	5.36	5.83	6.34	7.47	8.12	9.67	20.33*	58.65*
700	8	3.05	3.22	3.73	4.02	4.32	4.63	5.30	5.65	6.40	9.40*	14.84*
	10	3.40	3.61	4.21	4.55	4.90	5.28	6.09	6.53	7.49	11.79*	22.89*
	14	4.06	4.33	5.11	5.56	6.04	6.56	7.73	8.39	9.97	20.49*	58.65*
750	8	3.14	3.32	3.85	4.15	4.46	4.78	5.47	5.83	6.60	9.67*	15.15*
	10	3.52	3.73	4.35	4.70	5.06	5.45	6.29	6.74	7.72	12.09*	23.02*
	14	4.20	4.47	5.28	5.74	6.24	6.78	7.97	8.66	10.26	20.66*	58.65*
800	8	3.24	3.42	3.97	4.27	4.59	4.93	5.63	6.00	6.79	9.93*	15.45*
	10	3.63	3.84	4.48	4.84	5.22	5.62	6.48	6.94	7.95	12.38*	23.17*
	14	4.33	4.62	5.45	5.93	6.44	6.99	8.22	8.91	10.55	20.85*	58.65*
850	8	3.34	3.52	4.08	4.40	4.73	5.07	5.79	6.17	6.98	10.18*	15.74*
	10	3.74	3.96	4.61	4.98	5.37	5.78	6.66	7.14	8.17	12.67*	23.34*
	14	4.47	4.76	5.62	6.11	6.63	7.19	8.45	9.16	10.82	21.05*	58.65*
900	8	3.43	3.62	4.20	4.52	4.86	5.21	5.94	6.34	7.17	10.43*	16.04*
	10	3.84	4.07	4.74	5.12	5.52	5.94	6.84	7.33	8.38	12.95*	23.52*
	14	4.60	4.90	5.78	6.28	6.82	7.39	8.68	9.40	11.09	21.26*	58.65*
950	8	3.52	3.71	4.31	4.64	4.98	5.34	6.10	6.50	7.35	10.67*	16.33*
	10	3.95	4.18	4.87	5.26	5.67	6.10	7.02	7.52	8.59	13.23*	23.71*
	14	4.72	5.04	5.94	6.45	7.00	7.59	8.90	9.64	11.35	21.48*	58.65*
1000	8	3.61	3.81	4.41	4.75	5.11	5.47	6.25	6.65	7.52	10.91*	16.62*
	10	4.05	4.29	4.99	5.39	5.81	6.25	7.19	7.70	8.80	13.50*	23.92*
	14	4.85	5.17	6.09	6.62	7.18	7.78	9.12	9.87	11.61	21.71*	58.65*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.5 m (RADIUS = 4.6 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	1.95	2.09	2.58	2.91	3.32	3.91	6.27	8.29	14.20	56.90*	172.06*
	10	2.13	2.33	2.99	3.51	4.31	5.72	10.90	14.81	26.22	109.22*	333.78*
	14	2.50	2.82	4.22	5.97	9.04	13.42	27.51	38.11	69.16	296.22*	911.71*
100	8	2.47	2.66	3.25	3.63	4.09	4.66	6.57	8.35	14.20	56.90*	172.06*
	10	2.74	2.98	3.77	4.32	5.06	6.17	10.91	14.81	26.22	109.22*	333.78*
	14	3.26	3.65	5.08	6.47	9.09	13.42	27.51	38.11	69.16	296.22*	911.71*
150	8	2.89	3.11	3.79	4.21	4.71	5.31	7.10	8.63	14.20	56.90*	172.06*
	10	3.22	3.51	4.39	4.99	5.75	6.80	10.98	14.81	26.22	109.22*	333.78*
	14	3.86	4.31	5.84	7.15	9.40	13.44	27.51	38.11	69.16	296.22*	911.71*
200	8	3.25	3.50	4.25	4.71	5.25	5.88	7.67	9.07	14.24	56.90*	172.06*
	10	3.64	3.96	4.93	5.57	6.37	7.41	11.21	14.84	26.22	109.22*	333.78*
	14	4.39	4.89	6.51	7.81	9.87	13.54	27.51	38.11	69.16	296.22*	911.71*
250	8	3.58	3.85	4.67	5.17	5.74	6.40	8.21	9.55	14.34	56.90*	172.06*
	10	4.02	4.37	5.42	6.10	6.93	7.98	11.56	14.94	26.22	109.22*	333.78*
	14	4.86	5.40	7.12	8.44	10.41	13.77	27.51	38.11	69.16	296.22*	911.71*
300	8	3.88	4.17	5.05	5.58	6.19	6.88	8.72	10.03	14.53	56.90*	172.06*
	10	4.37	4.74	5.87	6.59	7.45	8.52	11.97	15.12	26.22	109.22*	333.78*
	14	5.30	5.87	7.68	9.02	10.95	14.10	27.51	38.11	69.16	296.22*	911.71*
350	8	4.16	4.48	5.41	5.97	6.60	7.33	9.21	10.51	14.79	56.90*	172.06*
	10	4.69	5.09	6.28	7.04	7.93	9.03	12.41	15.38	26.22	109.22*	333.78*
	14	5.70	6.31	8.20	9.58	11.49	14.49	27.51	38.11	69.16	296.22*	911.71*
400	8	4.43	4.76	5.74	6.33	7.00	7.75	9.67	10.98	15.10	56.90*	172.06*
	10	5.00	5.42	6.68	7.46	8.39	9.51	12.86	15.69	26.23	109.22*	333.78*
	14	6.08	6.73	8.70	10.10	12.02	14.91	27.52	38.11	69.16	296.22*	911.71*
450	8	4.68	5.03	6.06	6.68	7.37	8.15	10.12	11.43	15.44	56.90*	172.06*
	10	5.29	5.74	7.05	7.86	8.82	9.97	13.31	16.04	26.26	109.22*	333.78*
	14	6.45	7.12	9.17	10.60	12.53	15.35	27.55	38.11	69.16	296.22*	911.71*
500	8	4.92	5.29	6.36	7.01	7.72	8.53	10.55	11.87	15.80	56.90*	172.06*
	10	5.57	6.04	7.40	8.25	9.23	10.41	13.76	16.41	26.30	109.22*	333.78*
	14	6.79	7.49	9.61	11.08	13.02	15.80	27.60	38.11	69.16	296.22*	911.71*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.5 m (RADIUS = 4.6 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	5.15	5.54	6.66	7.32	8.06	8.90	10.96	12.29	16.17	56.90*	172.06*
	10	5.84	6.32	7.74	8.62	9.63	10.83	14.19	16.79	26.37	109.22*	333.78*
	14	7.12	7.85	10.04	11.54	13.50	16.25	27.67	38.11	69.16	296.22*	911.71*
600	8	5.37	5.78	6.94	7.63	8.39	9.25	11.35	12.70	16.55	56.90*	172.06*
	10	6.09	6.60	8.07	8.97	10.01	11.24	14.62	17.18	26.47	109.22*	333.78*
	14	7.44	8.20	10.45	11.99	13.96	16.70	27.78	38.12	69.16	296.22*	911.71*
650	8	5.59	6.01	7.21	7.92	8.71	9.59	11.74	13.10	16.93	56.90*	172.06*
	10	6.34	6.87	8.38	9.31	10.38	11.63	15.04	17.57	26.59	109.22*	333.78*
	14	7.75	8.53	10.85	12.42	14.41	17.14	27.91	38.13	69.16	296.22*	911.71*
700	8	5.80	6.23	7.47	8.20	9.01	9.92	12.11	13.49	17.30	56.90*	172.06*
	10	6.58	7.12	8.69	9.64	10.74	12.02	15.45	17.96	26.74	109.22*	333.78*
	14	8.05	8.86	11.24	12.83	14.85	17.57	28.07	38.15	69.16	296.22*	911.71*
750	8	6.00	6.45	7.72	8.48	9.31	10.24	12.47	13.87	17.68	56.90*	172.06*
	10	6.82	7.38	8.98	9.97	11.09	12.39	15.85	18.35	26.92	109.22*	333.78*
	14	8.34	9.17	11.61	13.24	15.28	18.00	28.27	38.18	69.16	296.22*	911.71*
800	8	6.20	6.66	7.97	8.75	9.60	10.55	12.82	14.23	18.05	56.90*	172.06*
	10	7.04	7.62	9.27	10.28	11.42	12.75	16.25	18.73	27.12	109.22*	333.78*
	14	8.63	9.48	11.97	13.63	15.70	18.42	28.48	38.22	69.16	296.22*	911.71*
850	8	6.39	6.86	8.21	9.01	9.88	10.85	13.16	14.59	18.42	56.90*	172.06*
	10	7.27	7.86	9.55	10.58	11.75	13.10	16.63	19.11	27.34	109.22*	333.78*
	14	8.90	9.77	12.33	14.01	16.10	18.84	28.72	38.28	69.16	296.22*	911.71*
900	8	6.58	7.06	8.45	9.26	10.16	11.14	13.50	14.94	18.78	56.90*	172.06*
	10	7.48	8.09	9.83	10.88	12.07	13.44	17.01	19.49	27.58	109.22*	333.78*
	14	9.17	10.06	12.67	14.39	16.50	19.25	28.97	38.35	69.16	296.22*	911.71*
950	8	6.76	7.26	8.68	9.51	10.42	11.43	13.83	15.29	19.14	56.90*	172.06*
	10	7.69	8.32	10.09	11.17	12.38	13.78	17.38	19.86	27.83	109.22*	333.78*
	14	9.43	10.35	13.01	14.75	16.89	19.65	29.24	38.44	69.16	296.22*	911.71*
1000	8	6.94	7.45	8.90	9.75	10.69	11.71	14.15	15.63	19.49	56.90*	172.06*
	10	7.90	8.54	10.36	11.45	12.69	14.11	17.74	20.23	28.09	109.22*	333.78*
	14	9.69	10.63	13.34	15.11	17.27	20.04	29.52	38.54	69.16	296.22*	911.71*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.5 m (RADIUS = 4.6 m)
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	3.66	4.40	9.67	15.89	25.03	38.00	79.81	111.34	203.81	880.99*	2717.9*
	10	4.25	5.68	17.59	29.65	47.42	72.65	154.15	215.63	396.07	1718.2*	5305.3*
	14	5.81	11.68	45.89	78.83	127.43	196.49	419.79	588.33	1083.1	4710.0*	14552.*
100	8	4.77	5.59	9.92	15.89	25.03	38.00	79.81	111.34	203.81	880.99*	2717.9*
	10	5.55	6.95	17.59	29.65	47.42	72.65	154.15	215.63	396.07	1718.2*	5305.3*
	14	7.38	11.96	45.89	78.83	127.43	196.49	419.79	588.33	1083.1	4710.0*	14552.*
150	8	5.66	6.56	10.58	15.94	25.03	38.00	79.81	111.34	203.81	880.99*	2717.9*
	10	6.59	8.04	17.62	29.65	47.42	72.65	154.15	215.63	396.07	1718.2*	5305.3*
	14	8.67	12.72	45.89	78.83	127.43	196.49	419.79	588.33	1083.1	4710.0*	14552.*
200	8	6.43	7.40	11.35	16.15	25.03	38.00	79.81	111.34	203.81	880.99*	2717.9*
	10	7.49	9.01	17.79	29.65	47.42	72.65	154.15	215.63	396.07	1718.2*	5305.3*
	14	9.80	13.65	45.89	78.83	127.43	196.49	419.79	588.33	1083.1	4710.0*	14552.*
250	8	7.12	8.16	12.12	16.53	25.05	38.00	79.81	111.34	203.81	880.99*	2717.9*
	10	8.29	9.89	18.14	29.66	47.42	72.65	154.15	215.63	396.07	1718.2*	5305.3*
	14	10.82	14.59	45.89	78.83	127.43	196.49	419.79	588.33	1083.1	4710.0*	14552.*
300	8	7.76	8.86	12.87	17.03	25.11	38.00	79.81	111.34	203.81	880.99*	2717.9*
	10	9.03	10.69	18.62	29.67	47.42	72.65	154.15	215.63	396.07	1718.2*	5305.3*
	14	11.75	15.51	45.89	78.83	127.43	196.49	419.79	588.33	1083.1	4710.0*	14552.*
350	8	8.35	9.50	13.59	17.59	25.23	38.00	79.81	111.34	203.81	880.99*	2717.9*
	10	9.72	11.44	19.17	29.73	47.42	72.65	154.15	215.63	396.07	1718.2*	5305.3*
	14	12.63	16.39	45.89	78.83	127.43	196.49	419.79	588.33	1083.1	4710.0*	14552.*
400	8	8.91	10.11	14.28	18.18	25.43	38.00	79.81	111.34	203.81	880.99*	2717.9*
	10	10.37	12.15	19.77	29.83	47.42	72.65	154.15	215.63	396.07	1718.2*	5305.3*
	14	13.45	17.24	45.90	78.83	127.43	196.49	419.79	588.33	1083.1	4710.0*	14552.*
450	8	9.44	10.69	14.94	18.78	25.69	38.02	79.81	111.34	203.81	880.99*	2717.9*
	10	10.99	12.83	20.39	30.00	47.42	72.65	154.15	215.63	396.07	1718.2*	5305.3*
	14	14.22	18.06	45.91	78.83	127.43	196.49	419.79	588.33	1083.1	4710.0*	14552.*
500	8	9.94	11.24	15.58	19.37	26.02	38.05	79.81	111.34	203.81	880.99*	2717.9*
	10	11.58	13.47	21.01	30.22	47.43	72.65	154.15	215.63	396.07	1718.2*	5305.3*
	14	14.97	18.84	45.93	78.83	127.43	196.49	419.79	588.33	1083.1	4710.0*	14552.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.5 m (RADIUS = 4.6 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}	°C/min											
550	8	10.43	11.77	16.20	19.97	26.39	38.10	79.81	111.34	203.81	880.99*	2717.9*
	10	12.14	14.09	21.64	30.51	47.44	72.65	154.15	215.63	396.07	1718.2*	5305.3*
	14	15.68	19.60	45.96	78.83	127.43	196.49	419.79	588.33	1083.1	4710.0*	14552.*
600	8	10.89	12.28	16.79	20.55	26.80	38.17	79.81	111.34	203.81	880.99*	2717.9*
	10	12.69	14.68	22.25	30.84	47.45	72.65	154.15	215.63	396.07	1718.2*	5305.3*
	14	16.36	20.33	46.02	78.83	127.43	196.49	419.79	588.33	1083.1	4710.0*	14552.*
650	8	11.34	12.77	17.37	21.13	27.23	38.28	79.81	111.34	203.81	880.99*	2717.9*
	10	13.21	15.25	22.86	31.21	47.48	72.65	154.15	215.63	396.07	1718.2*	5305.3*
	14	17.02	21.04	46.11	78.83	127.43	196.49	419.79	588.33	1083.1	4710.0*	14552.*
700	8	11.78	13.24	17.92	21.69	27.68	38.42	79.81	111.34	203.81	880.99*	2717.9*
	10	13.72	15.80	23.46	31.61	47.53	72.65	154.15	215.63	396.07	1718.2*	5305.3*
	14	17.66	21.73	46.23	78.83	127.43	196.49	419.79	588.33	1083.1	4710.0*	14552.*
750	8	12.20	13.70	18.47	22.25	28.15	38.59	79.81	111.34	203.81	880.99*	2717.9*
	10	14.21	16.34	24.05	32.03	47.60	72.65	154.15	215.63	396.07	1718.2*	5305.3*
	14	18.28	22.40	46.39	78.83	127.43	196.49	419.79	588.33	1083.1	4710.0*	14552.*
800	8	12.61	14.15	19.00	22.79	28.62	38.79	79.81	111.34	203.81	880.99*	2717.9*
	10	14.69	16.87	24.63	32.48	47.68	72.65	154.15	215.63	396.07	1718.2*	5305.3*
	14	18.89	23.05	46.58	78.83	127.43	196.49	419.79	588.33	1083.1	4710.0*	14552.*
850	8	13.02	14.59	19.51	23.33	29.09	39.03	79.81	111.34	203.81	880.99*	2717.9*
	10	15.15	17.37	25.20	32.93	47.80	72.65	154.15	215.63	396.07	1718.2*	5305.3*
	14	19.47	23.68	46.80	78.84	127.43	196.49	419.79	588.33	1083.1	4710.0*	14552.*
900	8	13.41	15.01	20.02	23.85	29.57	39.29	79.81	111.34	203.81	880.99*	2717.9*
	10	15.61	17.87	25.76	33.40	47.93	72.66	154.15	215.63	396.07	1718.2*	5305.3*
	14	20.05	24.31	47.06	78.84	127.43	196.49	419.79	588.33	1083.1	4710.0*	14552.*
950	8	13.79	15.43	20.51	24.37	30.05	39.57	79.81	111.34	203.81	880.99*	2717.9*
	10	16.05	18.36	26.31	33.87	48.09	72.66	154.15	215.63	396.07	1718.2*	5305.3*
	14	20.61	24.91	47.34	78.84	127.43	196.49	419.79	588.33	1083.1	4710.0*	14552.*
1000	8	14.16	15.83	20.99	24.87	30.53	39.87	79.82	111.34	203.81	880.99*	2717.9*
	10	16.49	18.83	26.85	34.35	48.28	72.67	154.15	215.63	396.07	1718.2*	5305.3*
	14	21.15	25.51	47.65	78.85	127.43	196.49	419.79	588.33	1083.1	4710.0*	14552.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.0 m (RADIUS = 4.9 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	0.80	0.83	0.93	1.00	1.06	1.13	1.26	1.33	1.47	1.94*	2.55*	
	10	0.84	0.87	0.99	1.05	1.12	1.19	1.34	1.42	1.58	2.13*	3.02*	
	14	0.91	0.95	1.08	1.16	1.24	1.32	1.50	1.60	1.80	2.69*	5.22*	
100	8	0.94	0.97	1.10	1.17	1.24	1.32	1.48	1.56	1.73	2.28*	2.99*	
	10	1.00	1.03	1.17	1.25	1.33	1.42	1.60	1.69	1.88	2.53*	3.48*	
	14	1.10	1.15	1.31	1.40	1.50	1.61	1.82	1.94	2.18	3.15*	5.31*	
150	8	1.05	1.08	1.22	1.31	1.39	1.48	1.66	1.75	1.93	2.54*	3.34*	
	10	1.12	1.16	1.32	1.41	1.50	1.60	1.80	1.90	2.11	2.84*	3.88*	
	14	1.26	1.31	1.50	1.60	1.71	1.83	2.08	2.21	2.48	3.53*	5.58*	
200	8	1.14	1.18	1.34	1.43	1.52	1.61	1.81	1.91	2.11	2.78*	3.64*	
	10	1.23	1.28	1.45	1.55	1.65	1.76	1.97	2.09	2.32	3.11*	4.23*	
	14	1.39	1.45	1.66	1.77	1.90	2.03	2.30	2.44	2.74	3.87*	5.92*	
250	8	1.23	1.27	1.44	1.54	1.63	1.74	1.94	2.05	2.27	2.99*	3.92*	
	10	1.33	1.38	1.57	1.67	1.78	1.90	2.13	2.25	2.50	3.36*	4.54*	
	14	1.51	1.58	1.80	1.93	2.06	2.20	2.49	2.65	2.97	4.18*	6.26*	
300	8	1.30	1.35	1.53	1.64	1.74	1.85	2.07	2.18	2.42	3.18*	4.17*	
	10	1.42	1.47	1.67	1.79	1.91	2.03	2.28	2.41	2.67	3.58*	4.84*	
	14	1.62	1.69	1.93	2.07	2.22	2.36	2.68	2.84	3.19	4.46*	6.59*	
350	8	1.38	1.43	1.62	1.73	1.84	1.95	2.19	2.31	2.55	3.36*	4.40*	
	10	1.50	1.56	1.77	1.90	2.02	2.15	2.41	2.55	2.83	3.79*	5.11*	
	14	1.73	1.80	2.06	2.20	2.36	2.52	2.85	3.02	3.39	4.72*	6.91*	
400	8	1.45	1.50	1.70	1.82	1.93	2.05	2.30	2.43	2.68	3.53*	4.62*	
	10	1.58	1.64	1.87	2.00	2.13	2.26	2.54	2.69	2.98	3.99*	5.37*	
	14	1.82	1.90	2.18	2.33	2.49	2.66	3.01	3.19	3.57	4.97*	7.22*	
450	8	1.51	1.57	1.78	1.90	2.02	2.15	2.40	2.54	2.80	3.69*	4.83*	
	10	1.66	1.72	1.96	2.09	2.23	2.37	2.66	2.82	3.13	4.18*	5.61*	
	14	1.92	2.00	2.29	2.45	2.62	2.79	3.16	3.35	3.75	5.21*	7.51*	
500	8	1.58	1.64	1.86	1.98	2.11	2.24	2.51	2.64	2.92	3.84*	5.03*	
	10	1.73	1.80	2.05	2.18	2.33	2.48	2.78	2.94	3.26	4.35*	5.84*	
	14	2.01	2.09	2.39	2.56	2.74	2.92	3.30	3.50	3.92	5.43*	7.80*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.0 m (RADIUS = 4.9 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	1.64	1.70	1.93	2.06	2.19	2.32	2.60	2.74	3.03	3.99*	5.22*
	10	1.80	1.87	2.13	2.27	2.42	2.58	2.89	3.06	3.39	4.52*	6.07*
	14	2.09	2.18	2.50	2.67	2.86	3.05	3.44	3.65	4.08	5.65*	8.07*
600	8	1.70	1.76	2.00	2.13	2.27	2.41	2.70	2.84	3.14	4.13*	5.41*
	10	1.87	1.94	2.21	2.36	2.51	2.67	3.00	3.17	3.52	4.69*	6.28*
	14	2.17	2.27	2.59	2.78	2.97	3.16	3.58	3.79	4.24	5.86*	8.34*
650	8	1.75	1.82	2.06	2.20	2.34	2.49	2.79	2.94	3.25	4.27*	5.59*
	10	1.93	2.01	2.29	2.44	2.60	2.76	3.10	3.28	3.64	4.85*	6.49*
	14	2.25	2.35	2.69	2.88	3.08	3.28	3.71	3.93	4.39	6.06*	8.59*
700	8	1.81	1.88	2.13	2.27	2.42	2.57	2.87	3.03	3.35	4.40*	5.76*
	10	1.99	2.08	2.36	2.52	2.68	2.85	3.20	3.38	3.75	5.00*	6.69*
	14	2.33	2.44	2.78	2.98	3.18	3.39	3.83	4.06	4.54	6.25*	8.84*
750	8	1.86	1.93	2.19	2.34	2.49	2.64	2.96	3.12	3.45	4.53*	5.93*
	10	2.05	2.14	2.43	2.60	2.77	2.94	3.30	3.49	3.87	5.15*	6.88*
	14	2.40	2.51	2.87	3.07	3.28	3.50	3.95	4.19	4.68	6.44*	9.08*
800	8	1.91	1.99	2.25	2.40	2.56	2.72	3.04	3.20	3.54	4.65*	6.09*
	10	2.11	2.20	2.50	2.67	2.85	3.03	3.40	3.59	3.98	5.30*	7.07*
	14	2.48	2.59	2.96	3.17	3.38	3.61	4.07	4.31	4.82	6.62*	9.32*
850	8	1.96	2.04	2.31	2.47	2.63	2.79	3.12	3.29	3.63	4.77*	6.25*
	10	2.17	2.26	2.57	2.75	2.93	3.11	3.49	3.68	4.09	5.44*	7.26*
	14	2.55	2.67	3.04	3.26	3.48	3.71	4.19	4.44	4.95	6.80*	9.55*
900	8	2.01	2.09	2.37	2.53	2.69	2.86	3.20	3.37	3.73	4.89*	6.40*
	10	2.23	2.32	2.64	2.82	3.00	3.19	3.58	3.78	4.19	5.57*	7.44*
	14	2.62	2.74	3.13	3.35	3.57	3.81	4.30	4.55	5.09	6.97*	9.78*
950	8	2.06	2.14	2.43	2.59	2.76	2.93	3.27	3.45	3.81	5.01*	6.55*
	10	2.28	2.38	2.70	2.89	3.08	3.27	3.67	3.87	4.29	5.71*	7.61*
	14	2.69	2.81	3.21	3.43	3.67	3.91	4.41	4.67	5.21	7.14*	10.00*
1000	8	2.11	2.19	2.49	2.65	2.82	2.99	3.35	3.53	3.90	5.12*	6.70*
	10	2.34	2.44	2.77	2.96	3.15	3.35	3.75	3.96	4.39	5.84*	7.79*
	14	2.75	2.88	3.29	3.52	3.76	4.00	4.52	4.78	5.34	7.31*	10.21*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.0 m (RADIUS = 4.9 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	1.25	1.31	1.50	1.62	1.74	1.87	2.15	2.31	2.69	5.31*	13.25*
	10	1.34	1.40	1.63	1.76	1.91	2.06	2.43	2.66	3.27	8.88*	24.13*
	14	1.50	1.58	1.88	2.07	2.28	2.53	3.26	3.87	5.99	21.68*	63.02*
100	8	1.53	1.59	1.84	1.97	2.12	2.28	2.62	2.81	3.23	5.52*	13.25*
	10	1.65	1.74	2.01	2.18	2.35	2.55	2.98	3.23	3.84	8.88*	24.13*
	14	1.89	2.00	2.37	2.59	2.85	3.13	3.87	4.39	6.11	21.68*	63.02*
150	8	1.75	1.83	2.10	2.26	2.43	2.61	2.99	3.20	3.67	5.92*	13.25*
	10	1.91	2.00	2.33	2.51	2.71	2.93	3.41	3.69	4.34	8.93*	24.13*
	14	2.20	2.34	2.76	3.01	3.30	3.62	4.41	4.92	6.46	21.68*	63.02*
200	8	1.94	2.03	2.34	2.51	2.70	2.89	3.32	3.55	4.05	6.34*	13.26*
	10	2.13	2.24	2.59	2.80	3.03	3.26	3.79	4.09	4.78	9.09*	24.13*
	14	2.48	2.63	3.10	3.38	3.69	4.04	4.87	5.40	6.88	21.68*	63.02*
250	8	2.11	2.21	2.55	2.74	2.94	3.15	3.61	3.85	4.39	6.75*	13.31*
	10	2.33	2.45	2.84	3.06	3.31	3.56	4.13	4.45	5.17	9.35*	24.13*
	14	2.72	2.89	3.40	3.71	4.04	4.41	5.30	5.84	7.31	21.68*	63.02*
300	8	2.27	2.38	2.74	2.94	3.16	3.39	3.87	4.14	4.71	7.14*	13.41*
	10	2.51	2.64	3.06	3.30	3.56	3.84	4.44	4.78	5.54	9.65*	24.13*
	14	2.95	3.13	3.68	4.01	4.37	4.76	5.69	6.25	7.72	21.68*	63.02*
350	8	2.42	2.54	2.92	3.14	3.37	3.61	4.12	4.40	5.00	7.51*	13.57*
	10	2.68	2.82	3.27	3.53	3.80	4.09	4.73	5.08	5.88	9.98*	24.13*
	14	3.16	3.35	3.94	4.29	4.67	5.08	6.05	6.64	8.12	21.68*	63.02*
400	8	2.56	2.69	3.09	3.32	3.56	3.82	4.36	4.65	5.28	7.86*	13.78*
	10	2.84	2.99	3.47	3.74	4.03	4.33	5.00	5.37	6.20	10.32*	24.14*
	14	3.36	3.56	4.19	4.55	4.95	5.39	6.40	7.00	8.51	21.69*	63.02*
450	8	2.70	2.83	3.25	3.49	3.75	4.01	4.58	4.88	5.54	8.20*	14.02*
	10	3.00	3.15	3.65	3.94	4.24	4.56	5.26	5.65	6.51	10.66*	24.14*
	14	3.55	3.76	4.42	4.80	5.22	5.68	6.72	7.34	8.88	21.70*	63.02*
500	8	2.82	2.96	3.40	3.66	3.92	4.20	4.79	5.11	5.79	8.53*	14.29*
	10	3.14	3.31	3.83	4.13	4.45	4.78	5.51	5.91	6.80	11.00*	24.16*
	14	3.73	3.96	4.64	5.04	5.48	5.95	7.04	7.67	9.23	21.74*	63.02*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.0 m (RADIUS = 4.9 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	2.95	3.09	3.55	3.82	4.09	4.38	4.99	5.32	6.03	8.84*	14.57*
	10	3.29	3.46	4.00	4.31	4.64	4.99	5.75	6.16	7.08	11.33*	24.19*
	14	3.91	4.14	4.86	5.27	5.73	6.21	7.34	7.99	9.57	21.79*	63.02*
600	8	3.07	3.21	3.69	3.97	4.25	4.55	5.19	5.53	6.26	9.14*	14.86*
	10	3.42	3.60	4.17	4.49	4.83	5.19	5.97	6.40	7.35	11.65*	24.23*
	14	4.07	4.32	5.06	5.49	5.96	6.47	7.62	8.29	9.91	21.86*	63.02*
650	8	3.18	3.33	3.83	4.11	4.41	4.72	5.38	5.73	6.48	9.43*	15.16*
	10	3.55	3.74	4.32	4.66	5.01	5.39	6.19	6.63	7.60	11.97*	24.30*
	14	4.24	4.49	5.26	5.71	6.19	6.71	7.90	8.59	10.23	21.95*	63.02*
700	8	3.29	3.45	3.97	4.26	4.56	4.88	5.56	5.92	6.69	9.71*	15.46*
	10	3.68	3.87	4.48	4.82	5.19	5.57	6.41	6.86	7.86	12.28*	24.38*
	14	4.39	4.66	5.45	5.91	6.41	6.95	8.17	8.87	10.54	22.07*	63.02*
750	8	3.40	3.56	4.10	4.40	4.71	5.04	5.74	6.11	6.90	9.99*	15.76*
	10	3.80	4.00	4.63	4.98	5.36	5.76	6.61	7.08	8.10	12.58*	24.48*
	14	4.55	4.82	5.64	6.11	6.63	7.18	8.43	9.15	10.84	22.21*	63.02*
800	8	3.50	3.67	4.22	4.53	4.86	5.19	5.91	6.29	7.11	10.25*	16.05*
	10	3.92	4.13	4.77	5.14	5.53	5.93	6.81	7.29	8.34	12.88*	24.60*
	14	4.69	4.97	5.82	6.31	6.84	7.40	8.68	9.41	11.14	22.36*	63.02*
850	8	3.60	3.78	4.34	4.66	5.00	5.34	6.08	6.47	7.30	10.51*	16.35*
	10	4.04	4.25	4.92	5.29	5.69	6.11	7.01	7.50	8.57	13.17*	24.74*
	14	4.84	5.13	6.00	6.50	7.04	7.62	8.93	9.68	11.43	22.53*	63.02*
900	8	3.70	3.89	4.46	4.79	5.13	5.49	6.24	6.64	7.50	10.77*	16.64*
	10	4.16	4.38	5.05	5.44	5.85	6.28	7.20	7.70	8.79	13.46*	24.90*
	14	4.98	5.28	6.17	6.68	7.24	7.83	9.17	9.93	11.71	22.72*	63.02*
950	8	3.80	3.99	4.58	4.92	5.27	5.63	6.40	6.81	7.68	11.02*	16.94*
	10	4.27	4.49	5.19	5.58	6.00	6.44	7.39	7.90	9.01	13.74*	25.07*
	14	5.12	5.42	6.34	6.86	7.43	8.04	9.41	10.18	11.98	22.92*	63.02*
1000	8	3.90	4.09	4.70	5.04	5.40	5.77	6.56	6.98	7.87	11.26*	17.22*
	10	4.38	4.61	5.32	5.73	6.15	6.60	7.57	8.09	9.23	14.02*	25.25*
	14	5.25	5.57	6.50	7.04	7.62	8.24	9.64	10.42	12.25	23.12*	63.02*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.0 m (RADIUS = 4.9 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}	°C/min											
50	8	2.10	2.25	2.76	3.11	3.58	4.25	7.02	9.29	15.82	62.15*	185.07*
	10	2.31	2.51	3.23	3.82	4.79	6.49	12.36	16.72	29.34	119.44*	359.15*
	14	2.72	3.08	4.75	6.95	10.52	15.54	31.44	43.28	77.66	324.19*	981.30*
100	8	2.67	2.86	3.48	3.88	4.38	5.01	7.24	9.32	15.82	62.15*	185.07*
	10	2.96	3.22	4.06	4.67	5.52	6.84	12.36	16.72	29.34	119.44*	359.15*
	14	3.54	3.97	5.60	7.31	10.54	15.54	31.44	43.28	77.66	324.19*	981.30*
150	8	3.12	3.34	4.05	4.50	5.03	5.69	7.73	9.52	15.82	62.15*	185.07*
	10	3.49	3.78	4.73	5.38	6.23	7.43	12.40	16.72	29.34	119.44*	359.15*
	14	4.20	4.69	6.40	7.94	10.73	15.54	31.44	43.28	77.66	324.19*	981.30*
200	8	3.52	3.77	4.55	5.04	5.61	6.29	8.28	9.90	15.83	62.15*	185.07*
	10	3.95	4.28	5.31	6.00	6.87	8.05	12.54	16.73	29.34	119.44*	359.15*
	14	4.78	5.31	7.10	8.61	11.11	15.59	31.44	43.28	77.66	324.19*	981.30*
250	8	3.87	4.15	4.99	5.52	6.13	6.84	8.83	10.36	15.89	62.15*	185.07*
	10	4.36	4.72	5.83	6.56	7.46	8.64	12.82	16.78	29.34	119.44*	359.15*
	14	5.29	5.86	7.75	9.25	11.60	15.72	31.44	43.28	77.66	324.19*	981.30*
300	8	4.20	4.50	5.40	5.96	6.60	7.35	9.36	10.84	16.02	62.15*	185.07*
	10	4.74	5.12	6.31	7.07	8.01	9.20	13.18	16.90	29.34	119.44*	359.15*
	14	5.76	6.38	8.35	9.86	12.13	15.96	31.44	43.28	77.66	324.19*	981.30*
350	8	4.51	4.82	5.79	6.37	7.04	7.82	9.86	11.32	16.23	62.15*	185.07*
	10	5.09	5.50	6.75	7.56	8.52	9.73	13.60	17.10	29.34	119.44*	359.15*
	14	6.21	6.85	8.91	10.44	12.66	16.28	31.44	43.28	77.66	324.19*	981.30*
400	8	4.80	5.13	6.15	6.76	7.46	8.26	10.35	11.79	16.50	62.15*	185.07*
	10	5.43	5.86	7.17	8.01	9.00	10.23	14.03	17.35	29.34	119.44*	359.15*
	14	6.62	7.30	9.43	11.00	13.20	16.65	31.44	43.28	77.66	324.19*	981.30*
450	8	5.07	5.42	6.49	7.13	7.86	8.69	10.81	12.26	16.80	62.15*	185.07*
	10	5.74	6.20	7.57	8.44	9.46	10.72	14.48	17.66	29.35	119.44*	359.15*
	14	7.02	7.73	9.93	11.53	13.72	17.06	31.45	43.28	77.66	324.19*	981.30*
500	8	5.33	5.70	6.81	7.48	8.24	9.09	11.26	12.71	17.14	62.15*	185.07*
	10	6.05	6.52	7.95	8.85	9.90	11.18	14.92	17.99	29.38	119.44*	359.15*
	14	7.39	8.13	10.41	12.03	14.23	17.49	31.47	43.28	77.66	324.19*	981.30*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.0 m (RADIUS = 4.9 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C/min												
550	8	5.58	5.97	7.12	7.82	8.60	9.48	11.69	13.14	17.50	62.15*	185.07*	
	10	6.34	6.83	8.31	9.24	10.32	11.62	15.36	18.35	29.41	119.44*	359.15*	
	14	7.75	8.52	10.87	12.52	14.72	17.93	31.51	43.28	77.66	324.19*	981.30*	
600	8	5.83	6.23	7.42	8.14	8.95	9.85	12.10	13.57	17.86	62.15*	185.07*	
	10	6.61	7.13	8.66	9.62	10.73	12.05	15.80	18.73	29.47	119.44*	359.15*	
	14	8.10	8.89	11.31	12.99	15.21	18.37	31.57	43.28	77.66	324.19*	981.30*	
650	8	6.06	6.48	7.71	8.46	9.28	10.21	12.50	13.98	18.24	62.15*	185.07*	
	10	6.88	7.42	9.00	9.98	11.12	12.47	16.23	19.11	29.56	119.44*	359.15*	
	14	8.44	9.26	11.74	13.45	15.68	18.81	31.65	43.29	77.66	324.19*	981.30*	
700	8	6.29	6.72	7.99	8.76	9.61	10.56	12.89	14.39	18.61	62.15*	185.07*	
	10	7.15	7.70	9.33	10.34	11.50	12.87	16.65	19.49	29.66	119.44*	359.15*	
	14	8.76	9.61	12.15	13.89	16.14	19.25	31.75	43.30	77.66	324.19*	981.30*	
750	8	6.51	6.95	8.27	9.05	9.92	10.90	13.27	14.78	18.99	62.15*	185.07*	
	10	7.40	7.97	9.64	10.68	11.87	13.27	17.07	19.88	29.80	119.44*	359.15*	
	14	9.08	9.95	12.55	14.32	16.59	19.69	31.89	43.31	77.66	324.19*	981.30*	
800	8	6.72	7.18	8.53	9.34	10.23	11.23	13.64	15.17	19.36	62.15*	185.07*	
	10	7.65	8.23	9.95	11.01	12.23	13.65	17.47	20.27	29.95	119.44*	359.15*	
	14	9.39	10.28	12.94	14.74	17.02	20.12	32.04	43.33	77.66	324.19*	981.30*	
850	8	6.93	7.40	8.79	9.61	10.53	11.55	14.00	15.54	19.73	62.15*	185.07*	
	10	7.89	8.49	10.25	11.34	12.58	14.02	17.87	20.65	30.13	119.44*	359.15*	
	14	9.69	10.60	13.32	15.14	17.45	20.55	32.22	43.36	77.66	324.19*	981.30*	
900	8	7.13	7.62	9.04	9.89	10.82	11.86	14.36	15.91	20.10	62.15*	185.07*	
	10	8.12	8.74	10.55	11.65	12.92	14.38	18.27	21.03	30.33	119.44*	359.15*	
	14	9.98	10.91	13.69	15.54	17.87	20.97	32.43	43.40	77.66	324.19*	981.30*	
950	8	7.33	7.83	9.29	10.15	11.11	12.16	14.70	16.27	20.47	62.15*	185.07*	
	10	8.35	8.98	10.83	11.96	13.25	14.74	18.65	21.41	30.55	119.44*	359.15*	
	14	10.27	11.22	14.05	15.93	18.28	21.38	32.65	43.44	77.66	324.19*	981.30*	
1000	8	7.53	8.04	9.53	10.41	11.38	12.46	15.04	16.62	20.83	62.15*	185.07*	
	10	8.58	9.22	11.11	12.26	13.57	15.08	19.03	21.79	30.78	119.44*	359.15*	
	14	10.55	11.52	14.40	16.31	18.69	21.79	32.89	43.51	77.66	324.19*	981.30*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.0 m (RADIUS = 4.9 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	4.00	4.88	11.53	18.82	29.40	44.25	91.49	126.72	229.13	964.47*	2925.6*
	10	4.70	6.55	21.18	35.33	55.91	84.82	176.90	245.64	445.47	1881.2*	5711.0*
	14	6.66	14.55	55.65	94.32	150.63	229.80	482.15	670.60	1218.6	5157.3*	15665.*
100	8	5.22	6.16	11.65	18.82	29.40	44.25	91.49	126.72	229.13	964.47*	2925.6*
	10	6.11	7.81	21.18	35.33	55.91	84.82	176.90	245.64	445.47	1881.2*	5711.0*
	14	8.31	14.64	55.65	94.32	150.63	229.80	482.15	670.60	1218.6	5157.3*	15665.*
150	8	6.19	7.20	12.13	18.84	29.40	44.25	91.49	126.72	229.13	964.47*	2925.6*
	10	7.25	8.96	21.19	35.33	55.91	84.82	176.90	245.64	445.47	1881.2*	5711.0*
	14	9.70	15.13	55.65	94.32	150.63	229.80	482.15	670.60	1218.6	5157.3*	15665.*
200	8	7.03	8.11	12.83	18.93	29.40	44.25	91.49	126.72	229.13	964.47*	2925.6*
	10	8.23	10.00	21.25	35.33	55.91	84.82	176.90	245.64	445.47	1881.2*	5711.0*
	14	10.92	15.92	55.65	94.32	150.63	229.80	482.15	670.60	1218.6	5157.3*	15665.*
250	8	7.78	8.93	13.58	19.17	29.41	44.25	91.49	126.72	229.13	964.47*	2925.6*
	10	9.11	10.94	21.43	35.33	55.91	84.82	176.90	245.64	445.47	1881.2*	5711.0*
	14	12.03	16.81	55.65	94.32	150.63	229.80	482.15	670.60	1218.6	5157.3*	15665.*
300	8	8.47	9.68	14.34	19.54	29.43	44.25	91.49	126.72	229.13	964.47*	2925.6*
	10	9.91	11.80	21.75	35.33	55.91	84.82	176.90	245.64	445.47	1881.2*	5711.0*
	14	13.05	17.72	55.65	94.32	150.63	229.80	482.15	670.60	1218.6	5157.3*	15665.*
350	8	9.12	10.38	15.08	20.01	29.48	44.25	91.49	126.72	229.13	964.47*	2925.6*
	10	10.67	12.62	22.18	35.35	55.91	84.82	176.90	245.64	445.47	1881.2*	5711.0*
	14	14.00	18.62	55.65	94.32	150.63	229.80	482.15	670.60	1218.6	5157.3*	15665.*
400	8	9.73	11.04	15.79	20.54	29.58	44.25	91.49	126.72	229.13	964.47*	2925.6*
	10	11.38	13.38	22.70	35.39	55.91	84.82	176.90	245.64	445.47	1881.2*	5711.0*
	14	14.89	19.50	55.65	94.32	150.63	229.80	482.15	670.60	1218.6	5157.3*	15665.*
450	8	10.31	11.67	16.48	21.10	29.73	44.26	91.49	126.72	229.13	964.47*	2925.6*
	10	12.05	14.11	23.25	35.46	55.91	84.82	176.90	245.64	445.47	1881.2*	5711.0*
	14	15.74	20.35	55.65	94.32	150.63	229.80	482.15	670.60	1218.6	5157.3*	15665.*
500	8	10.86	12.26	17.15	21.68	29.95	44.26	91.49	126.72	229.13	964.47*	2925.6*
	10	12.69	14.80	23.84	35.57	55.91	84.82	176.90	245.64	445.47	1881.2*	5711.0*
	14	16.55	21.18	55.66	94.32	150.63	229.80	482.15	670.60	1218.6	5157.3*	15665.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.0 m (RADIUS = 4.9 m)
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}	°C/min											
550	8	11.38	12.84	17.80	22.26	30.23	44.28	91.49	126.72	229.13	964.47*	2925.6*
	10	13.31	15.47	24.44	35.74	55.91	84.82	176.90	245.64	445.47	1881.2*	5711.0*
	14	17.32	21.98	55.67	94.32	150.63	229.80	482.15	670.60	1218.6	5157.3*	15665.*
600	8	11.89	13.39	18.43	22.85	30.55	44.31	91.49	126.72	229.13	964.47*	2925.6*
	10	13.90	16.11	25.05	35.95	55.92	84.82	176.90	245.64	445.47	1881.2*	5711.0*
	14	18.07	22.76	55.68	94.32	150.63	229.80	482.15	670.60	1218.6	5157.3*	15665.*
650	8	12.38	13.92	19.04	23.43	30.91	44.36	91.49	126.72	229.13	964.47*	2925.6*
	10	14.47	16.73	25.66	36.21	55.93	84.82	176.90	245.64	445.47	1881.2*	5711.0*
	14	18.79	23.52	55.71	94.32	150.63	229.80	482.15	670.60	1218.6	5157.3*	15665.*
700	8	12.86	14.43	19.63	24.01	31.30	44.43	91.49	126.72	229.13	964.47*	2925.6*
	10	15.02	17.33	26.26	36.51	55.94	84.82	176.90	245.64	445.47	1881.2*	5711.0*
	14	19.49	24.25	55.75	94.32	150.63	229.80	482.15	670.60	1218.6	5157.3*	15665.*
750	8	13.32	14.93	20.21	24.58	31.71	44.53	91.49	126.72	229.13	964.47*	2925.6*
	10	15.56	17.91	26.86	36.85	55.96	84.82	176.90	245.64	445.47	1881.2*	5711.0*
	14	20.17	24.97	55.81	94.32	150.63	229.80	482.15	670.60	1218.6	5157.3*	15665.*
800	8	13.77	15.41	20.77	25.14	32.15	44.65	91.49	126.72	229.13	964.47*	2925.6*
	10	16.08	18.48	27.46	37.22	56.00	84.82	176.90	245.64	445.47	1881.2*	5711.0*
	14	20.82	25.67	55.90	94.32	150.63	229.80	482.15	670.60	1218.6	5157.3*	15665.*
850	8	14.20	15.89	21.32	25.69	32.59	44.80	91.49	126.72	229.13	964.47*	2925.6*
	10	16.59	19.03	28.04	37.61	56.05	84.82	176.90	245.64	445.47	1881.2*	5711.0*
	14	21.46	26.35	56.00	94.32	150.63	229.80	482.15	670.60	1218.6	5157.3*	15665.*
900	8	14.63	16.35	21.86	26.24	33.05	44.98	91.49	126.72	229.13	964.47*	2925.6*
	10	17.08	19.57	28.62	38.02	56.11	84.82	176.90	245.64	445.47	1881.2*	5711.0*
	14	22.09	27.02	56.14	94.32	150.63	229.80	482.15	670.60	1218.6	5157.3*	15665.*
950	8	15.05	16.80	22.38	26.77	33.51	45.18	91.49	126.72	229.13	964.47*	2925.6*
	10	17.57	20.09	29.20	38.45	56.19	84.82	176.90	245.64	445.47	1881.2*	5711.0*
	14	22.70	27.67	56.30	94.32	150.63	229.80	482.15	670.60	1218.6	5157.3*	15665.*
1000	8	15.45	17.24	22.90	27.30	33.97	45.40	91.49	126.72	229.13	964.47*	2925.6*
	10	18.04	20.61	29.76	38.89	56.30	84.82	176.90	245.64	445.47	1881.2*	5711.0*
	14	23.30	28.31	56.49	94.33	150.63	229.80	482.15	670.60	1218.6	5157.3*	15665.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.5 m (RADIUS = 5.3 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	0.86	0.87	0.98	1.04	1.11	1.17	1.31	1.38	1.52	1.98*	2.61*	
	10	0.90	0.92	1.03	1.10	1.17	1.24	1.39	1.47	1.63	2.19*	3.12*	
	14	0.98	1.01	1.14	1.21	1.30	1.38	1.56	1.66	1.87	2.80*	5.52*	
100	8	1.00	1.03	1.15	1.22	1.30	1.38	1.54	1.62	1.79	2.33*	3.05*	
	10	1.06	1.09	1.23	1.31	1.39	1.48	1.66	1.75	1.94	2.59*	3.57*	
	14	1.18	1.22	1.38	1.48	1.57	1.68	1.90	2.01	2.26	3.25*	5.59*	
150	8	1.12	1.15	1.29	1.37	1.45	1.54	1.72	1.81	2.00	2.60*	3.41*	
	10	1.20	1.23	1.39	1.48	1.57	1.67	1.87	1.97	2.19	2.91*	3.97*	
	14	1.35	1.39	1.58	1.69	1.80	1.92	2.17	2.30	2.58	3.64*	5.83*	
200	8	1.22	1.25	1.41	1.50	1.59	1.68	1.88	1.98	2.18	2.84*	3.72*	
	10	1.32	1.36	1.53	1.63	1.73	1.84	2.06	2.17	2.40	3.19*	4.33*	
	14	1.49	1.54	1.75	1.87	1.99	2.12	2.40	2.54	2.85	3.99*	6.15*	
250	8	1.31	1.35	1.52	1.61	1.71	1.81	2.02	2.13	2.35	3.06*	4.00*	
	10	1.42	1.47	1.65	1.76	1.87	1.98	2.22	2.34	2.60	3.44*	4.65*	
	14	1.62	1.68	1.90	2.03	2.17	2.31	2.61	2.76	3.09	4.30*	6.48*	
300	8	1.40	1.44	1.62	1.72	1.82	1.93	2.16	2.27	2.50	3.25*	4.26*	
	10	1.52	1.57	1.77	1.88	2.00	2.12	2.37	2.51	2.78	3.67*	4.95*	
	14	1.74	1.80	2.04	2.18	2.33	2.48	2.80	2.96	3.32	4.59*	6.81*	
350	8	1.48	1.52	1.71	1.82	1.93	2.04	2.28	2.40	2.65	3.44*	4.50*	
	10	1.61	1.66	1.87	1.99	2.12	2.25	2.52	2.66	2.94	3.89*	5.23*	
	14	1.85	1.92	2.18	2.32	2.48	2.64	2.97	3.15	3.52	4.86*	7.13*	
400	8	1.55	1.60	1.80	1.91	2.03	2.15	2.40	2.52	2.78	3.61*	4.72*	
	10	1.70	1.75	1.97	2.10	2.23	2.37	2.65	2.80	3.10	4.09*	5.49*	
	14	1.96	2.03	2.30	2.46	2.62	2.79	3.14	3.33	3.72	5.12*	7.44*	
450	8	1.62	1.67	1.88	2.00	2.12	2.25	2.51	2.64	2.91	3.78*	4.93*	
	10	1.78	1.84	2.07	2.20	2.34	2.48	2.78	2.93	3.25	4.28*	5.74*	
	14	2.06	2.14	2.42	2.58	2.75	2.93	3.30	3.50	3.91	5.36*	7.74*	
500	8	1.69	1.74	1.96	2.08	2.21	2.34	2.61	2.75	3.03	3.93*	5.14*	
	10	1.86	1.92	2.16	2.30	2.45	2.59	2.90	3.06	3.39	4.46*	5.98*	
	14	2.15	2.24	2.53	2.70	2.88	3.07	3.45	3.66	4.08	5.59*	8.03*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.5 m (RADIUS = 5.3 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	1.76	1.81	2.04	2.16	2.30	2.43	2.71	2.86	3.15	4.08*	5.33*
	10	1.93	2.00	2.25	2.39	2.54	2.70	3.02	3.18	3.52	4.64*	6.21*
	14	2.25	2.33	2.64	2.82	3.01	3.20	3.60	3.81	4.26	5.81*	8.31*
600	8	1.82	1.88	2.11	2.24	2.38	2.52	2.81	2.96	3.26	4.23*	5.52*
	10	2.00	2.07	2.33	2.48	2.64	2.80	3.13	3.30	3.65	4.81*	6.43*
	14	2.33	2.43	2.75	2.93	3.12	3.32	3.74	3.96	4.42	6.02*	8.58*
650	8	1.88	1.94	2.18	2.32	2.46	2.61	2.90	3.06	3.37	4.37*	5.70*
	10	2.07	2.15	2.42	2.57	2.73	2.90	3.24	3.42	3.78	4.97*	6.64*
	14	2.42	2.52	2.85	3.04	3.24	3.44	3.88	4.10	4.58	6.23*	8.84*
700	8	1.94	2.00	2.25	2.39	2.54	2.69	3.00	3.15	3.48	4.50*	5.88*
	10	2.14	2.22	2.50	2.66	2.82	2.99	3.35	3.53	3.90	5.13*	6.84*
	14	2.50	2.60	2.95	3.14	3.35	3.56	4.01	4.24	4.73	6.43*	9.09*
750	8	2.00	2.06	2.32	2.46	2.61	2.77	3.08	3.25	3.58	4.63*	6.05*
	10	2.21	2.28	2.57	2.74	2.91	3.08	3.45	3.64	4.02	5.28*	7.04*
	14	2.58	2.69	3.04	3.24	3.46	3.68	4.14	4.38	4.88	6.62*	9.34*
800	8	2.05	2.12	2.38	2.53	2.69	2.85	3.17	3.34	3.68	4.76*	6.21*
	10	2.27	2.35	2.65	2.82	2.99	3.17	3.55	3.74	4.14	5.43*	7.23*
	14	2.66	2.77	3.13	3.34	3.56	3.79	4.26	4.51	5.02	6.81*	9.58*
850	8	2.11	2.18	2.45	2.60	2.76	2.92	3.26	3.43	3.78	4.89*	6.38*
	10	2.33	2.42	2.72	2.90	3.08	3.26	3.65	3.84	4.25	5.57*	7.42*
	14	2.74	2.85	3.23	3.44	3.66	3.90	4.38	4.63	5.16	6.99*	9.81*
900	8	2.16	2.23	2.51	2.67	2.83	3.00	3.34	3.51	3.87	5.01*	6.53*
	10	2.39	2.48	2.79	2.97	3.16	3.35	3.74	3.94	4.36	5.71*	7.61*
	14	2.81	2.93	3.31	3.53	3.76	4.00	4.50	4.76	5.30	7.17*	10.04*
950	8	2.21	2.29	2.57	2.73	2.90	3.07	3.42	3.60	3.96	5.13*	6.69*
	10	2.45	2.54	2.86	3.05	3.23	3.43	3.83	4.04	4.47	5.85*	7.79*
	14	2.89	3.00	3.40	3.63	3.86	4.10	4.61	4.88	5.44	7.34*	10.27*
1000	8	2.26	2.34	2.63	2.79	2.96	3.14	3.50	3.68	4.05	5.24*	6.84*
	10	2.51	2.60	2.93	3.12	3.31	3.51	3.92	4.14	4.57	5.99*	7.96*
	14	2.96	3.08	3.48	3.72	3.96	4.21	4.73	5.00	5.57	7.51*	10.49*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.5 m (RADIUS = 5.3 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	1.34	1.39	1.58	1.70	1.82	1.95	2.25	2.41	2.81	5.67*	14.13*
	10	1.43	1.49	1.72	1.85	2.00	2.17	2.56	2.80	3.46	9.58*	25.83*
	14	1.61	1.69	2.00	2.19	2.42	2.69	3.51	4.21	6.59	23.57*	67.63*
100	8	1.64	1.70	1.94	2.08	2.23	2.39	2.74	2.93	3.37	5.84*	14.13*
	10	1.77	1.85	2.13	2.30	2.48	2.68	3.12	3.39	4.04	9.58*	25.83*
	14	2.03	2.14	2.52	2.75	3.01	3.32	4.12	4.70	6.67	23.57*	67.63*
150	8	1.87	1.95	2.22	2.38	2.56	2.74	3.13	3.35	3.83	6.21*	14.13*
	10	2.05	2.14	2.46	2.65	2.86	3.08	3.58	3.87	4.56	9.61*	25.83*
	14	2.37	2.50	2.93	3.20	3.49	3.83	4.67	5.24	6.97	23.57*	67.63*
200	8	2.08	2.16	2.47	2.65	2.84	3.04	3.47	3.71	4.23	6.62*	14.14*
	10	2.29	2.39	2.75	2.96	3.19	3.43	3.98	4.29	5.01	9.73*	25.83*
	14	2.66	2.81	3.29	3.59	3.91	4.27	5.16	5.73	7.37	23.57*	67.63*
250	8	2.27	2.36	2.69	2.89	3.09	3.31	3.78	4.03	4.58	7.03*	14.16*
	10	2.50	2.62	3.01	3.24	3.49	3.75	4.34	4.67	5.43	9.94*	25.83*
	14	2.93	3.09	3.62	3.93	4.28	4.67	5.61	6.19	7.80	23.57*	67.63*
300	8	2.44	2.54	2.90	3.11	3.33	3.56	4.06	4.33	4.91	7.42*	14.24*
	10	2.70	2.82	3.25	3.49	3.76	4.04	4.66	5.01	5.81	10.21*	25.83*
	14	3.18	3.35	3.92	4.25	4.63	5.04	6.02	6.62	8.22	23.57*	67.63*
350	8	2.60	2.71	3.09	3.31	3.55	3.79	4.32	4.60	5.22	7.79*	14.36*
	10	2.88	3.02	3.47	3.73	4.01	4.31	4.97	5.33	6.16	10.52*	25.83*
	14	3.40	3.59	4.19	4.55	4.95	5.38	6.40	7.02	8.63	23.57*	67.63*
400	8	2.75	2.87	3.27	3.51	3.75	4.01	4.56	4.86	5.51	8.15*	14.54*
	10	3.06	3.20	3.68	3.95	4.25	4.56	5.25	5.64	6.50	10.85*	25.83*
	14	3.62	3.82	4.46	4.83	5.25	5.70	6.76	7.40	9.02	23.57*	67.63*
450	8	2.90	3.02	3.44	3.69	3.95	4.22	4.80	5.11	5.78	8.49*	14.75*
	10	3.22	3.37	3.88	4.17	4.48	4.81	5.53	5.93	6.82	11.18*	25.83*
	14	3.82	4.04	4.70	5.10	5.53	6.00	7.10	7.76	9.40	23.58*	67.63*
500	8	3.04	3.16	3.61	3.86	4.13	4.42	5.02	5.34	6.04	8.83*	15.00*
	10	3.38	3.54	4.06	4.37	4.69	5.04	5.79	6.20	7.12	11.51*	25.84*
	14	4.02	4.24	4.94	5.35	5.80	6.30	7.43	8.10	9.77	23.60*	67.63*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.5 m (RADIUS = 5.3 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	3.17	3.30	3.77	4.03	4.31	4.61	5.23	5.57	6.29	9.14*	15.26*
	10	3.54	3.70	4.25	4.56	4.90	5.26	6.04	6.46	7.42	11.84*	25.86*
	14	4.21	4.44	5.17	5.60	6.06	6.57	7.75	8.43	10.13	23.63*	67.63*
600	8	3.30	3.44	3.92	4.19	4.48	4.79	5.44	5.79	6.53	9.45*	15.54*
	10	3.68	3.85	4.42	4.75	5.10	5.47	6.28	6.72	7.70	12.16*	25.89*
	14	4.39	4.63	5.39	5.83	6.32	6.84	8.05	8.75	10.47	23.67*	67.63*
650	8	3.42	3.57	4.06	4.35	4.65	4.97	5.64	6.00	6.77	9.75*	15.82*
	10	3.82	4.00	4.59	4.93	5.29	5.67	6.51	6.96	7.97	12.48*	25.93*
	14	4.56	4.81	5.60	6.06	6.56	7.10	8.34	9.06	10.81	23.74*	67.63*
700	8	3.54	3.69	4.21	4.50	4.81	5.14	5.83	6.20	6.99	10.04*	16.11*
	10	3.96	4.15	4.76	5.11	5.48	5.87	6.73	7.20	8.23	12.80*	25.99*
	14	4.73	4.99	5.80	6.28	6.79	7.35	8.62	9.36	11.13	23.82*	67.63*
750	8	3.65	3.81	4.34	4.65	4.97	5.30	6.02	6.40	7.21	10.32*	16.41*
	10	4.09	4.29	4.91	5.28	5.66	6.07	6.95	7.43	8.48	13.10*	26.07*
	14	4.90	5.17	6.00	6.49	7.02	7.59	8.90	9.65	11.45	23.92*	67.63*
800	8	3.77	3.93	4.48	4.79	5.12	5.46	6.20	6.59	7.42	10.59*	16.70*
	10	4.22	4.42	5.07	5.44	5.84	6.25	7.16	7.65	8.73	13.41*	26.16*
	14	5.06	5.33	6.19	6.70	7.24	7.83	9.16	9.93	11.75	24.04*	67.63*
850	8	3.88	4.05	4.61	4.93	5.27	5.62	6.37	6.77	7.63	10.86*	16.99*
	10	4.35	4.56	5.22	5.60	6.01	6.44	7.36	7.87	8.97	13.70*	26.27*
	14	5.22	5.50	6.38	6.90	7.46	8.06	9.42	10.20	12.05	24.18*	67.63*
900	8	3.99	4.16	4.74	5.07	5.41	5.78	6.55	6.96	7.83	11.12*	17.29*
	10	4.47	4.69	5.37	5.76	6.18	6.62	7.56	8.08	9.21	13.99*	26.40*
	14	5.37	5.66	6.57	7.10	7.67	8.28	9.67	10.47	12.35	24.34*	67.63*
950	8	4.09	4.27	4.86	5.20	5.55	5.93	6.71	7.13	8.03	11.37*	17.58*
	10	4.60	4.81	5.51	5.91	6.34	6.79	7.76	8.29	9.44	14.28*	26.54*
	14	5.52	5.82	6.75	7.29	7.87	8.50	9.92	10.73	12.64	24.51*	67.63*
1000	8	4.19	4.38	4.98	5.33	5.69	6.07	6.88	7.31	8.22	11.62*	17.86*
	10	4.71	4.94	5.65	6.06	6.50	6.96	7.95	8.49	9.66	14.56*	26.70*
	14	5.66	5.97	6.92	7.48	8.07	8.72	10.16	10.99	12.92	24.69*	67.63*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.5 m (RADIUS = 5.3 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	2.26	2.41	2.95	3.33	3.86	4.65	7.86	10.38	17.57	67.76*	198.81*
	10	2.48	2.70	3.49	4.18	5.35	7.37	13.97	18.82	32.74	130.37*	385.96*
	14	2.94	3.34	5.39	8.09	12.20	17.91	35.79	48.98	86.93	354.12*	1054.8*
100	8	2.87	3.06	3.71	4.15	4.68	5.39	8.00	10.39	17.57	67.76*	198.81*
	10	3.20	3.46	4.37	5.04	6.02	7.61	13.97	18.82	32.74	130.37*	385.96*
	14	3.84	4.31	6.19	8.31	12.21	17.91	35.79	48.98	86.93	354.12*	1054.8*
150	8	3.36	3.59	4.32	4.80	5.38	6.10	8.42	10.52	17.57	67.76*	198.81*
	10	3.77	4.07	5.08	5.79	6.74	8.14	13.98	18.82	32.74	130.37*	385.96*
	14	4.55	5.08	7.00	8.86	12.30	17.91	35.79	48.98	86.93	354.12*	1054.8*
200	8	3.79	4.04	4.85	5.37	5.98	6.73	8.95	10.83	17.58	67.76*	198.81*
	10	4.26	4.60	5.70	6.45	7.41	8.75	14.07	18.82	32.74	130.37*	385.96*
	14	5.17	5.75	7.74	9.51	12.57	17.93	35.79	48.98	86.93	354.12*	1054.8*
250	8	4.18	4.45	5.33	5.89	6.53	7.30	9.50	11.25	17.61	67.76*	198.81*
	10	4.71	5.08	6.25	7.04	8.03	9.35	14.26	18.85	32.74	130.37*	385.96*
	14	5.73	6.35	8.43	10.16	12.99	17.99	35.79	48.98	86.93	354.12*	1054.8*
300	8	4.53	4.83	5.77	6.36	7.03	7.83	10.04	11.72	17.70	67.76*	198.81*
	10	5.12	5.51	6.76	7.59	8.61	9.93	14.56	18.91	32.74	130.37*	385.96*
	14	6.25	6.90	9.06	10.78	13.47	18.14	35.79	48.98	86.93	354.12*	1054.8*
350	8	4.86	5.18	6.18	6.79	7.50	8.33	10.56	12.19	17.85	67.76*	198.81*
	10	5.50	5.92	7.24	8.10	9.15	10.48	14.93	19.04	32.74	130.37*	385.96*
	14	6.72	7.41	9.65	11.39	13.99	18.37	35.79	48.98	86.93	354.12*	1054.8*
400	8	5.17	5.51	6.56	7.21	7.95	8.80	11.06	12.67	18.06	67.76*	198.81*
	10	5.86	6.31	7.68	8.58	9.66	11.00	15.34	19.24	32.74	130.37*	385.96*
	14	7.17	7.89	10.21	11.96	14.51	18.68	35.79	48.98	86.93	354.12*	1054.8*
450	8	5.47	5.82	6.92	7.60	8.36	9.25	11.54	13.14	18.33	67.76*	198.81*
	10	6.20	6.67	8.11	9.03	10.14	11.51	15.77	19.49	32.74	130.37*	385.96*
	14	7.60	8.35	10.74	12.52	15.04	19.03	35.79	48.98	86.93	354.12*	1054.8*
500	8	5.75	6.12	7.27	7.97	8.76	9.67	12.01	13.60	18.63	67.76*	198.81*
	10	6.53	7.02	8.51	9.47	10.60	11.99	16.20	19.78	32.75	130.37*	385.96*
	14	8.01	8.79	11.25	13.05	15.56	19.42	35.80	48.98	86.93	354.12*	1054.8*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.5 m (RADIUS = 5.3 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	6.02	6.41	7.60	8.33	9.15	10.08	12.46	14.05	18.96	67.76*	198.81*	
	10	6.84	7.35	8.90	9.89	11.05	12.46	16.65	20.10	32.77	130.37*	385.96*	
	14	8.40	9.21	11.74	13.57	16.07	19.83	35.81	48.98	86.93	354.12*	1054.8*	
600	8	6.29	6.69	7.92	8.67	9.52	10.47	12.89	14.49	19.31	67.76*	198.81*	
	10	7.15	7.67	9.28	10.29	11.48	12.91	17.08	20.45	32.81	130.37*	385.96*	
	14	8.78	9.61	12.21	14.06	16.56	20.26	35.84	48.98	86.93	354.12*	1054.8*	
650	8	6.54	6.96	8.23	9.01	9.87	10.85	13.31	14.92	19.67	67.76*	198.81*	
	10	7.44	7.98	9.64	10.68	11.89	13.35	17.52	20.81	32.85	130.37*	385.96*	
	14	9.14	10.00	12.67	14.55	17.05	20.69	35.88	48.98	86.93	354.12*	1054.8*	
700	8	6.78	7.21	8.53	9.33	10.22	11.22	13.72	15.34	20.04	67.76*	198.81*	
	10	7.72	8.28	9.98	11.05	12.30	13.78	17.95	21.19	32.92	130.37*	385.96*	
	14	9.49	10.38	13.11	15.01	17.53	21.12	35.94	48.98	86.93	354.12*	1054.8*	
750	8	7.02	7.47	8.82	9.64	10.55	11.58	14.12	15.75	20.41	67.76*	198.81*	
	10	8.00	8.57	10.32	11.42	12.69	14.19	18.38	21.56	33.01	130.37*	385.96*	
	14	9.84	10.74	13.53	15.47	18.00	21.56	36.02	48.99	86.93	354.12*	1054.8*	
800	8	7.25	7.71	9.10	9.94	10.88	11.93	14.50	16.15	20.78	67.76*	198.81*	
	10	8.26	8.86	10.65	11.77	13.06	14.59	18.79	21.95	33.13	130.37*	385.96*	
	14	10.17	11.10	13.95	15.91	18.45	21.99	36.13	48.99	86.93	354.12*	1054.8*	
850	8	7.48	7.95	9.38	10.24	11.19	12.26	14.88	16.54	21.15	67.76*	198.81*	
	10	8.52	9.13	10.97	12.12	13.43	14.98	19.21	22.33	33.26	130.37*	385.96*	
	14	10.49	11.44	14.35	16.34	18.90	22.42	36.25	49.01	86.93	354.12*	1054.8*	
900	8	7.70	8.18	9.65	10.53	11.50	12.59	15.25	16.92	21.53	67.76*	198.81*	
	10	8.78	9.40	11.29	12.45	13.79	15.36	19.61	22.71	33.42	130.37*	385.96*	
	14	10.81	11.78	14.75	16.76	19.34	22.85	36.40	49.02	86.93	354.12*	1054.8*	
950	8	7.92	8.41	9.91	10.81	11.80	12.92	15.61	17.30	21.90	67.76*	198.81*	
	10	9.03	9.67	11.59	12.78	14.15	15.74	20.01	23.09	33.59	130.37*	385.96*	
	14	11.12	12.11	15.13	17.18	19.77	23.27	36.56	49.05	86.93	354.12*	1054.8*	
1000	8	8.13	8.63	10.17	11.08	12.10	13.23	15.96	17.66	22.26	67.76*	198.81*	
	10	9.27	9.92	11.89	13.10	14.49	16.10	20.40	23.47	33.78	130.37*	385.96*	
	14	11.42	12.44	15.51	17.58	20.19	23.69	36.75	49.08	86.93	354.12*	1054.8*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.5 m (RADIUS = 5.3 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	4.37	5.43	13.68	22.17	34.35	51.27	104.41	143.67	256.75	1053.8*	3144.9*
	10	5.19	7.64	25.32	41.81	65.51	98.47	202.10	278.69	499.38	2055.5*	6139.3*
	14	7.69	17.94	66.92	112.02	176.90	267.18	551.21	761.22	1366.5	5635.6*	16841.*
100	8	5.69	6.77	13.72	22.17	34.35	51.27	104.41	143.67	256.75	1053.8*	3144.9*
	10	6.71	8.80	25.32	41.81	65.51	98.47	202.10	278.69	499.38	2055.5*	6139.3*
	14	9.36	17.96	66.92	112.02	176.90	267.18	551.21	761.22	1366.5	5635.6*	16841.*
150	8	6.74	7.89	14.01	22.17	34.35	51.27	104.41	143.67	256.75	1053.8*	3144.9*
	10	7.94	9.99	25.32	41.81	65.51	98.47	202.10	278.69	499.38	2055.5*	6139.3*
	14	10.83	18.19	66.92	112.02	176.90	267.18	551.21	761.22	1366.5	5635.6*	16841.*
200	8	7.65	8.87	14.58	22.20	34.35	51.27	104.41	143.67	256.75	1053.8*	3144.9*
	10	9.00	11.08	25.34	41.81	65.51	98.47	202.10	278.69	499.38	2055.5*	6139.3*
	14	12.15	18.75	66.92	112.02	176.90	267.18	551.21	761.22	1366.5	5635.6*	16841.*
250	8	8.47	9.75	15.28	22.32	34.35	51.27	104.41	143.67	256.75	1053.8*	3144.9*
	10	9.96	12.08	25.41	41.81	65.51	98.47	202.10	278.69	499.38	2055.5*	6139.3*
	14	13.34	19.51	66.92	112.02	176.90	267.18	551.21	761.22	1366.5	5635.6*	16841.*
300	8	9.22	10.56	16.01	22.55	34.35	51.27	104.41	143.67	256.75	1053.8*	3144.9*
	10	10.84	13.01	25.58	41.81	65.51	98.47	202.10	278.69	499.38	2055.5*	6139.3*
	14	14.44	20.36	66.92	112.02	176.90	267.18	551.21	761.22	1366.5	5635.6*	16841.*
350	8	9.92	11.31	16.75	22.90	34.37	51.27	104.41	143.67	256.75	1053.8*	3144.9*
	10	11.65	13.88	25.86	41.81	65.51	98.47	202.10	278.69	499.38	2055.5*	6139.3*
	14	15.47	21.24	66.92	112.02	176.90	267.18	551.21	761.22	1366.5	5635.6*	16841.*
400	8	10.58	12.02	17.48	23.33	34.41	51.27	104.41	143.67	256.75	1053.8*	3144.9*
	10	12.42	14.70	26.24	41.82	65.51	98.47	202.10	278.69	499.38	2055.5*	6139.3*
	14	16.43	22.12	66.92	112.02	176.90	267.18	551.21	761.22	1366.5	5635.6*	16841.*
450	8	11.20	12.69	18.19	23.82	34.48	51.27	104.41	143.67	256.75	1053.8*	3144.9*
	10	13.15	15.48	26.69	41.85	65.51	98.47	202.10	278.69	499.38	2055.5*	6139.3*
	14	17.35	22.99	66.92	112.02	176.90	267.18	551.21	761.22	1366.5	5635.6*	16841.*
500	8	11.80	13.34	18.89	24.35	34.60	51.27	104.41	143.67	256.75	1053.8*	3144.9*
	10	13.85	16.23	27.20	41.89	65.51	98.47	202.10	278.69	499.38	2055.5*	6139.3*
	14	18.23	23.84	66.92	112.02	176.90	267.18	551.21	761.22	1366.5	5635.6*	16841.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 7.5 m (RADIUS = 5.3 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C/min												
550	8	12.37	13.95	19.56	24.91	34.77	51.27	104.41	143.67	256.75	1053.8*	3144.9*	
	10	14.51	16.94	27.75	41.97	65.51	98.47	202.10	278.69	499.38	2055.5*	6139.3*	
	14	19.07	24.67	66.92	112.02	176.90	267.18	551.21	761.22	1366.5	5635.6*	16841.*	
600	8	12.92	14.55	20.22	25.47	34.99	51.28	104.41	143.67	256.75	1053.8*	3144.9*	
	10	15.16	17.63	28.32	42.08	65.51	98.47	202.10	278.69	499.38	2055.5*	6139.3*	
	14	19.88	25.49	66.92	112.02	176.90	267.18	551.21	761.22	1366.5	5635.6*	16841.*	
650	8	13.46	15.12	20.86	26.05	35.26	51.30	104.41	143.67	256.75	1053.8*	3144.9*	
	10	15.78	18.30	28.90	42.23	65.52	98.47	202.10	278.69	499.38	2055.5*	6139.3*	
	14	20.66	26.28	66.93	112.02	176.90	267.18	551.21	761.22	1366.5	5635.6*	16841.*	
700	8	13.97	15.67	21.48	26.62	35.57	51.33	104.41	143.67	256.75	1053.8*	3144.9*	
	10	16.38	18.95	29.49	42.42	65.52	98.47	202.10	278.69	499.38	2055.5*	6139.3*	
	14	21.42	27.06	66.94	112.02	176.90	267.18	551.21	761.22	1366.5	5635.6*	16841.*	
750	8	14.47	16.21	22.09	27.19	35.91	51.38	104.41	143.67	256.75	1053.8*	3144.9*	
	10	16.96	19.57	30.08	42.65	65.53	98.47	202.10	278.69	499.38	2055.5*	6139.3*	
	14	22.15	27.82	66.96	112.02	176.90	267.18	551.21	761.22	1366.5	5635.6*	16841.*	
800	8	14.96	16.73	22.69	27.76	36.27	51.44	104.41	143.67	256.75	1053.8*	3144.9*	
	10	17.52	20.18	30.67	42.91	65.54	98.47	202.10	278.69	499.38	2055.5*	6139.3*	
	14	22.87	28.56	66.98	112.02	176.90	267.18	551.21	761.22	1366.5	5635.6*	16841.*	
850	8	15.43	17.24	23.27	28.32	36.66	51.52	104.41	143.67	256.75	1053.8*	3144.9*	
	10	18.07	20.78	31.26	43.21	65.55	98.47	202.10	278.69	499.38	2055.5*	6139.3*	
	14	23.56	29.29	67.02	112.02	176.90	267.18	551.21	761.22	1366.5	5635.6*	16841.*	
900	8	15.89	17.74	23.84	28.88	37.07	51.62	104.41	143.67	256.75	1053.8*	3144.9*	
	10	18.61	21.35	31.85	43.54	65.58	98.47	202.10	278.69	499.38	2055.5*	6139.3*	
	14	24.24	30.00	67.07	112.02	176.90	267.18	551.21	761.22	1366.5	5635.6*	16841.*	
950	8	16.34	18.22	24.39	29.43	37.50	51.74	104.41	143.67	256.75	1053.8*	3144.9*	
	10	19.14	21.92	32.43	43.89	65.61	98.47	202.10	278.69	499.38	2055.5*	6139.3*	
	14	24.90	30.69	67.14	112.02	176.90	267.18	551.21	761.22	1366.5	5635.6*	16841.*	
1000	8	16.78	18.70	24.94	29.98	37.93	51.89	104.41	143.67	256.75	1053.8*	3144.9*	
	10	19.65	22.47	33.01	44.26	65.66	98.47	202.10	278.69	499.38	2055.5*	6139.3*	
	14	25.55	31.37	67.23	112.02	176.90	267.18	551.21	761.22	1366.5	5635.6*	16841.*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 m (RADIUS = 5.7 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	0.91	0.92	1.03	1.09	1.15	1.22	1.35	1.42	1.56	2.03	2.67*	
	10	0.96	0.97	1.08	1.15	1.22	1.29	1.44	1.52	1.68	2.26	3.22*	
	14	1.04	1.06	1.19	1.27	1.35	1.44	1.62	1.72	1.94	2.92	5.84*	
100	8	1.06	1.09	1.21	1.28	1.35	1.43	1.59	1.67	1.84	2.39	3.12*	
	10	1.13	1.16	1.29	1.37	1.45	1.54	1.72	1.81	2.01	2.67	3.67*	
	14	1.26	1.29	1.45	1.55	1.65	1.75	1.97	2.09	2.35	3.38	5.89*	
150	8	1.19	1.22	1.35	1.43	1.52	1.60	1.78	1.88	2.07	2.68	3.48*	
	10	1.28	1.31	1.46	1.55	1.64	1.74	1.94	2.05	2.27	3.01	4.08*	
	14	1.44	1.48	1.66	1.77	1.88	2.00	2.26	2.39	2.68	3.78	6.09*	
200	8	1.30	1.33	1.48	1.57	1.66	1.76	1.95	2.05	2.26	2.93	3.80*	
	10	1.40	1.44	1.61	1.71	1.81	1.92	2.14	2.25	2.49	3.30	4.44*	
	14	1.59	1.64	1.84	1.96	2.09	2.22	2.50	2.65	2.96	4.14	6.39*	
250	8	1.40	1.43	1.59	1.69	1.79	1.89	2.10	2.21	2.43	3.15	4.08*	
	10	1.52	1.56	1.74	1.84	1.96	2.07	2.31	2.44	2.69	3.56	4.77*	
	14	1.73	1.78	2.01	2.14	2.27	2.42	2.72	2.88	3.21	4.47	6.72*	
300	8	1.49	1.53	1.70	1.80	1.91	2.02	2.24	2.36	2.59	3.36	4.35*	
	10	1.62	1.67	1.86	1.97	2.09	2.22	2.47	2.60	2.88	3.80	5.07*	
	14	1.86	1.92	2.16	2.30	2.44	2.59	2.92	3.09	3.45	4.77	7.05*	
350	8	1.58	1.61	1.80	1.91	2.02	2.13	2.37	2.49	2.74	3.55	4.59*	
	10	1.72	1.77	1.97	2.09	2.22	2.35	2.62	2.76	3.05	4.02	5.35*	
	14	1.98	2.04	2.30	2.44	2.60	2.76	3.10	3.28	3.67	5.05	7.37*	
400	8	1.66	1.70	1.89	2.00	2.12	2.24	2.49	2.62	2.88	3.73	4.82*	
	10	1.81	1.86	2.08	2.21	2.34	2.48	2.76	2.91	3.21	4.23	5.62*	
	14	2.09	2.16	2.43	2.59	2.75	2.92	3.28	3.47	3.87	5.31	7.68*	
450	8	1.73	1.78	1.98	2.10	2.22	2.35	2.61	2.74	3.02	3.90	5.04*	
	10	1.90	1.95	2.18	2.32	2.45	2.60	2.90	3.05	3.37	4.43	5.87*	
	14	2.20	2.27	2.56	2.72	2.89	3.07	3.45	3.65	4.06	5.56	7.98*	
500	8	1.81	1.85	2.06	2.19	2.31	2.45	2.72	2.86	3.14	4.06	5.24*	
	10	1.98	2.04	2.28	2.42	2.56	2.71	3.02	3.18	3.52	4.62	6.12*	
	14	2.30	2.38	2.68	2.85	3.03	3.21	3.61	3.81	4.25	5.80	8.27*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 m (RADIUS = 5.7 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	1.88	1.93	2.15	2.27	2.41	2.54	2.82	2.97	3.26	4.22	5.44*
	10	2.06	2.12	2.37	2.52	2.67	2.82	3.15	3.31	3.66	4.80	6.35*
	14	2.40	2.48	2.79	2.97	3.16	3.35	3.76	3.98	4.43	6.03	8.55*
600	8	1.94	2.00	2.22	2.36	2.49	2.63	2.93	3.08	3.38	4.37	5.64*
	10	2.14	2.20	2.46	2.61	2.77	2.93	3.26	3.44	3.79	4.97	6.57*
	14	2.50	2.58	2.90	3.09	3.28	3.48	3.91	4.13	4.60	6.25	8.83*
650	8	2.01	2.06	2.30	2.44	2.58	2.72	3.03	3.18	3.50	4.51	5.82*
	10	2.22	2.28	2.55	2.70	2.87	3.03	3.38	3.56	3.93	5.14	6.79*
	14	2.59	2.68	3.01	3.20	3.40	3.61	4.05	4.28	4.76	6.47	9.09*
700	8	2.07	2.13	2.37	2.51	2.66	2.81	3.12	3.28	3.61	4.65	6.00*
	10	2.29	2.36	2.63	2.79	2.96	3.13	3.49	3.67	4.05	5.31	7.00*
	14	2.68	2.77	3.11	3.31	3.52	3.73	4.19	4.43	4.92	6.67	9.35*
750	8	2.13	2.19	2.44	2.59	2.74	2.89	3.21	3.38	3.71	4.79	6.17*
	10	2.36	2.43	2.72	2.88	3.05	3.23	3.60	3.79	4.18	5.46	7.20*
	14	2.77	2.86	3.21	3.42	3.63	3.85	4.32	4.57	5.08	6.87	9.60*
800	8	2.19	2.26	2.51	2.66	2.82	2.98	3.30	3.47	3.82	4.92	6.34*
	10	2.43	2.50	2.79	2.96	3.14	3.32	3.70	3.90	4.30	5.62	7.40*
	14	2.85	2.95	3.31	3.52	3.74	3.97	4.45	4.70	5.23	7.07	9.85*
850	8	2.25	2.32	2.58	2.73	2.89	3.06	3.39	3.57	3.92	5.05	6.51*
	10	2.49	2.57	2.87	3.05	3.23	3.41	3.80	4.00	4.42	5.77	7.59*
	14	2.93	3.03	3.41	3.62	3.85	4.09	4.58	4.84	5.38	7.26	10.08*
900	8	2.31	2.37	2.65	2.80	2.97	3.13	3.48	3.66	4.02	5.18	6.67*
	10	2.56	2.64	2.95	3.13	3.31	3.50	3.90	4.11	4.53	5.91	7.78*
	14	3.01	3.12	3.50	3.72	3.96	4.20	4.70	4.97	5.52	7.44	10.32*
950	8	2.37	2.43	2.71	2.87	3.04	3.21	3.56	3.74	4.11	5.30	6.82*
	10	2.62	2.71	3.02	3.20	3.40	3.59	4.00	4.21	4.64	6.06	7.96*
	14	3.09	3.20	3.59	3.82	4.06	4.31	4.82	5.09	5.66	7.62	10.55*
1000	8	2.42	2.49	2.77	2.94	3.11	3.28	3.64	3.83	4.21	5.42	6.98*
	10	2.69	2.77	3.09	3.28	3.48	3.68	4.09	4.31	4.75	6.20	8.14*
	14	3.17	3.28	3.68	3.92	4.16	4.41	4.94	5.22	5.80	7.80	10.77*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 m (RADIUS = 5.7 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE
TIME INDEX
(m*s)^{1/2}

CEILING HEIGHT, m

RATE
OF RISE
°C/min

	1	2	4	5	6	7	9	10	12	18	24
50	1.43 1.53 1.72	1.47 1.58 1.80	1.66 1.81 2.11	1.78 1.95 2.32	1.91 2.10 2.56	2.04 2.27 2.85	2.34 2.68 3.78	2.52 2.94 4.59	2.93 3.68 7.24	6.07 10.33 25.59	15.06* 27.61* 72.50*
100	1.75 1.90 2.17	1.80 1.97 2.28	2.04 2.25 2.67	2.18 2.42 2.91	2.34 2.61 3.19	2.50 2.81 3.51	2.86 3.28 4.39	3.06 3.55 5.04	3.52 4.26 7.29	6.20 10.34 25.59	15.06* 27.61* 72.50*
150	2.00 2.19 2.54	2.07 2.28 2.67	2.34 2.60 3.11	2.51 2.80 3.39	2.68 3.01 3.70	2.87 3.24 4.05	3.27 3.76 4.96	3.49 4.06 5.58	3.99 4.79 7.54	6.54 10.35 25.59	15.06* 27.61* 72.50*
200	2.22 2.45 2.86	2.30 2.54 3.00	2.61 2.91 3.49	2.79 3.12 3.80	2.98 3.36 4.14	3.18 3.61 4.52	3.63 4.17 5.47	3.87 4.50 6.09	4.41 5.26 7.91	6.95 10.44 25.59	15.06* 27.61* 72.50*
250	2.43 2.68 3.14	2.51 2.79 3.30	2.84 3.18 3.84	3.04 3.42 4.17	3.25 3.67 4.53	3.47 3.94 4.94	3.95 4.55 5.93	4.21 4.89 6.56	4.78 5.69 8.33	7.37 10.62 25.59	15.08* 27.61* 72.50*
300	2.61 2.89 3.41	2.70 3.01 3.58	3.06 3.43 4.16	3.27 3.69 4.50	3.50 3.96 4.89	3.73 4.25 5.32	4.24 4.89 6.36	4.52 5.25 7.00	5.13 6.09 8.75	7.77 10.87 25.59	15.13* 27.61* 72.50*
350	2.78 3.09 3.65	2.88 3.22 3.84	3.27 3.67 4.45	3.49 3.94 4.82	3.73 4.22 5.23	3.98 4.53 5.68	4.52 5.21 6.76	4.81 5.59 7.42	5.45 6.46 9.16	8.15 11.16 25.59	15.22* 27.62* 72.50*
400	2.95 3.28 3.88	3.05 3.41 4.08	3.46 3.89 4.73	3.69 4.17 5.12	3.94 4.48 5.55	4.21 4.80 6.02	4.77 5.51 7.14	5.08 5.91 7.81	5.75 6.81 9.57	8.52 11.48 25.59	15.36* 27.62* 72.50*
450	3.10 3.45 4.10	3.22 3.60 4.31	3.64 4.10 4.99	3.89 4.40 5.40	4.15 4.72 5.85	4.43 5.05 6.34	5.02 5.80 7.50	5.34 6.21 8.19	6.03 7.14 9.96	8.87 11.81 25.59	15.55* 27.62* 72.50*
500	3.25 3.62 4.31	3.37 3.78 4.53	3.81 4.30 5.24	4.07 4.61 5.67	4.35 4.94 6.14	4.63 5.30 6.65	5.25 6.07 7.84	5.58 6.50 8.55	6.31 7.46 10.34	9.21 12.14 25.60	15.76* 27.62* 72.50*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 m (RADIUS = 5.7 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	3.39	3.52	3.98	4.25	4.53	4.83	5.48	5.82	6.57	9.54	16.00*	
	10	3.79	3.95	4.50	4.82	5.16	5.53	6.33	6.77	7.76	12.47	27.63*	
	14	4.52	4.74	5.49	5.93	6.41	6.94	8.17	8.90	10.71	25.62	72.50*	
600	8	3.53	3.66	4.14	4.42	4.72	5.03	5.69	6.05	6.82	9.86	16.26*	
	10	3.95	4.11	4.68	5.02	5.37	5.75	6.58	7.04	8.06	12.80	27.65*	
	14	4.71	4.95	5.72	6.18	6.68	7.22	8.49	9.23	11.06	25.65	72.50*	
650	8	3.66	3.80	4.30	4.59	4.89	5.21	5.90	6.27	7.06	10.17	16.54*	
	10	4.10	4.27	4.86	5.21	5.58	5.97	6.82	7.29	8.34	13.13	27.68*	
	14	4.90	5.14	5.94	6.42	6.93	7.50	8.79	9.55	11.41	25.70	72.50*	
700	8	3.79	3.93	4.45	4.75	5.06	5.39	6.10	6.48	7.30	10.47	16.82*	
	10	4.25	4.42	5.04	5.39	5.77	6.18	7.06	7.54	8.61	13.45	27.72*	
	14	5.08	5.34	6.16	6.65	7.18	7.76	9.09	9.86	11.74	25.76	72.50*	
750	8	3.91	4.06	4.59	4.90	5.23	5.57	6.30	6.69	7.52	10.76	17.10*	
	10	4.39	4.57	5.20	5.57	5.97	6.38	7.29	7.78	8.88	13.76	27.77*	
	14	5.26	5.52	6.37	6.87	7.42	8.02	9.38	10.17	12.07	25.84	72.50*	
800	8	4.04	4.19	4.74	5.05	5.39	5.74	6.49	6.89	7.74	11.04	17.39*	
	10	4.53	4.72	5.37	5.75	6.15	6.58	7.51	8.02	9.14	14.07	27.84*	
	14	5.43	5.70	6.58	7.09	7.65	8.26	9.65	10.46	12.39	25.94	72.50*	
850	8	4.15	4.31	4.87	5.20	5.54	5.90	6.67	7.08	7.96	11.32	17.68*	
	10	4.66	4.86	5.53	5.92	6.33	6.77	7.72	8.24	9.39	14.38	27.93*	
	14	5.60	5.88	6.78	7.31	7.88	8.51	9.93	10.75	12.70	26.05	72.50*	
900	8	4.27	4.43	5.01	5.34	5.70	6.07	6.85	7.27	8.17	11.59	17.96*	
	10	4.80	5.00	5.69	6.08	6.51	6.96	7.93	8.46	9.63	14.68	28.03*	
	14	5.76	6.05	6.97	7.51	8.10	8.74	10.19	11.03	13.01	26.18	72.50*	
950	8	4.38	4.55	5.14	5.48	5.85	6.22	7.03	7.46	8.38	11.85	18.25*	
	10	4.93	5.13	5.84	6.25	6.68	7.14	8.14	8.68	9.87	14.97	28.14*	
	14	5.92	6.22	7.16	7.72	8.32	8.97	10.45	11.30	13.31	26.33	72.50*	
1000	8	4.49	4.67	5.27	5.62	5.99	6.38	7.20	7.64	8.58	12.11	18.54*	
	10	5.05	5.27	5.99	6.41	6.85	7.32	8.34	8.89	10.11	15.26	28.27*	
	14	6.08	6.38	7.35	7.92	8.53	9.20	10.71	11.57	13.60	26.49	72.50*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 m (RADIUS = 5.7 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	2.42	2.57	3.14	3.57	4.17	5.10	8.79	11.57	19.48	73.74	213.30*	
	10	2.67	2.89	3.77	4.58	6.01	8.35	15.74	21.12	36.43	142.03	414.24*	
	14	3.18	3.63	6.15	9.38	14.09	20.55	40.59	55.23	97.02	386.08	1132.3*	
100	8	3.08	3.27	3.96	4.42	5.01	5.81	8.86	11.58	19.48	73.74	213.30*	
	10	3.43	3.71	4.69	5.45	6.59	8.50	15.74	21.12	36.43	142.03	414.24*	
	14	4.14	4.66	6.86	9.49	14.09	20.55	40.59	55.23	97.02	386.08	1132.3*	
150	8	3.61	3.84	4.61	5.12	5.74	6.53	9.21	11.66	19.48	73.74	213.30*	
	10	4.05	4.37	5.45	6.23	7.31	8.96	15.74	21.12	36.43	142.03	414.24*	
	14	4.92	5.49	7.67	9.93	14.13	20.55	40.59	55.23	97.02	386.08	1132.3*	
200	8	4.07	4.32	5.17	5.72	6.38	7.19	9.70	11.89	19.49	73.74	213.30*	
	10	4.58	4.94	6.10	6.92	8.00	9.54	15.79	21.12	36.43	142.03	414.24*	
	14	5.59	6.20	8.44	10.53	14.29	20.56	40.59	55.23	97.02	386.08	1132.3*	
250	8	4.48	4.76	5.68	6.26	6.95	7.79	10.24	12.26	19.50	73.74	213.30*	
	10	5.06	5.45	6.69	7.55	8.64	10.13	15.91	21.13	36.43	142.03	414.24*	
	14	6.19	6.85	9.16	11.17	14.61	20.59	40.59	55.23	97.02	386.08	1132.3*	
300	8	4.87	5.17	6.14	6.76	7.48	8.34	10.78	12.69	19.55	73.74	213.30*	
	10	5.51	5.92	7.23	8.12	9.24	10.72	16.14	21.16	36.43	142.03	414.24*	
	14	6.74	7.44	9.82	11.80	15.02	20.67	40.59	55.23	97.02	386.08	1132.3*	
350	8	5.22	5.54	6.58	7.23	7.98	8.87	11.31	13.15	19.65	73.74	213.30*	
	10	5.92	6.35	7.74	8.66	9.81	11.29	16.45	21.24	36.44	142.03	414.24*	
	14	7.26	7.99	10.45	12.42	15.50	20.81	40.59	55.23	97.02	386.08	1132.3*	
400	8	5.56	5.90	6.99	7.66	8.45	9.36	11.83	13.63	19.81	73.74	213.30*	
	10	6.31	6.76	8.22	9.17	10.34	11.83	16.81	21.38	36.44	142.03	414.24*	
	14	7.74	8.51	11.04	13.02	16.00	21.03	40.59	55.23	97.02	386.08	1132.3*	
450	8	5.88	6.23	7.37	8.08	8.89	9.83	12.32	14.10	20.03	73.74	213.30*	
	10	6.67	7.15	8.67	9.66	10.85	12.36	17.21	21.56	36.44	142.03	414.24*	
	14	8.20	9.00	11.60	13.60	16.52	21.32	40.59	55.23	97.02	386.08	1132.3*	
500	8	6.18	6.55	7.74	8.48	9.31	10.28	12.80	14.57	20.29	73.74	213.30*	
	10	7.03	7.53	9.10	10.12	11.34	12.86	17.63	21.80	36.44	142.03	414.24*	
	14	8.64	9.47	12.14	14.15	17.04	21.65	40.59	55.23	97.02	386.08	1132.3*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 m (RADIUS = 5.7 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550 (m*s) ^{1/2}	8	6.47	6.86	8.09	8.85	9.72	10.71	13.27	15.03	20.58	73.74	213.30*	
	10	7.36	7.88	9.51	10.56	11.81	13.35	18.06	22.08	36.45	142.03	414.24*	
	14	9.06	9.92	12.66	14.69	17.55	22.01	40.60	55.23	97.02	386.08	1132.3*	
600	8	6.75	7.16	8.44	9.22	10.11	11.12	13.72	15.48	20.90	73.74	213.30*	
	10	7.69	8.23	9.91	10.99	12.26	13.82	18.49	22.39	36.47	142.03	414.24*	
	14	9.47	10.35	13.16	15.21	18.06	22.40	40.61	55.23	97.02	386.08	1132.3*	
650	8	7.03	7.45	8.76	9.57	10.48	11.52	14.16	15.92	21.24	73.74	213.30*	
	10	8.00	8.56	10.29	11.40	12.70	14.28	18.93	22.72	36.49	142.03	414.24*	
	14	9.86	10.77	13.64	15.72	18.55	22.81	40.62	55.23	97.02	386.08	1132.3*	
700	8	7.29	7.72	9.08	9.91	10.85	11.91	14.58	16.35	21.60	73.74	213.30*	
	10	8.31	8.88	10.66	11.79	13.12	14.73	19.36	23.07	36.53	142.03	414.24*	
	14	10.24	11.17	14.11	16.21	19.05	23.22	40.65	55.23	97.02	386.08	1132.3*	
750	8	7.55	7.99	9.39	10.24	11.20	12.29	15.00	16.77	21.96	73.74	213.30*	
	10	8.60	9.20	11.02	12.18	13.54	15.16	19.79	23.43	36.59	142.03	414.24*	
	14	10.61	11.57	14.56	16.69	19.53	23.65	40.70	55.23	97.02	386.08	1132.3*	
800	8	7.80	8.25	9.69	10.56	11.54	12.65	15.40	17.18	22.32	73.74	213.30*	
	10	8.89	9.50	11.37	12.56	13.94	15.58	20.22	23.80	36.66	142.03	414.24*	
	14	10.97	11.95	15.00	17.15	20.00	24.07	40.75	55.23	97.02	386.08	1132.3*	
850	8	8.04	8.51	9.98	10.88	11.88	13.01	15.80	17.59	22.69	73.74	213.30*	
	10	9.17	9.80	11.71	12.92	14.32	15.99	20.64	24.17	36.76	142.03	414.24*	
	14	11.32	12.32	15.43	17.61	20.47	24.50	40.83	55.24	97.02	386.08	1132.3*	
900	8	8.28	8.76	10.27	11.18	12.21	13.35	16.18	17.99	23.06	73.74	213.30*	
	10	9.45	10.08	12.05	13.28	14.71	16.39	21.05	24.55	36.87	142.03	414.24*	
	14	11.66	12.68	15.85	18.05	20.92	24.93	40.92	55.25	97.02	386.08	1132.3*	
950	8	8.51	9.00	10.55	11.48	12.52	13.69	16.56	18.38	23.43	73.74	213.30*	
	10	9.71	10.37	12.37	13.63	15.08	16.79	21.46	24.93	37.00	142.03	414.24*	
	14	11.99	13.03	16.26	18.49	21.37	25.36	41.04	55.26	97.02	386.08	1132.3*	
1000	8	8.73	9.24	10.82	11.77	12.84	14.03	16.93	18.76	23.80	73.74	213.30*	
	10	9.97	10.64	12.69	13.97	15.44	17.17	21.87	25.31	37.15	142.03	414.24*	
	14	12.32	13.38	16.66	18.92	21.81	25.78	41.17	55.27	97.02	386.08	1132.3*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 m (RADIUS = 5.7 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	4.76	6.05	16.14	25.96	39.91	59.10	118.68	162.28	286.82	1149.1	3376.4*
	10	5.72	8.99	30.06	49.17	76.33	113.73	229.92	314.99	558.05	2241.7	6591.4*
	14	8.96	21.92	79.84	132.11	206.47	308.97	627.47	860.75	1527.4	6146.5	18081.*
100	8	6.18	7.44	16.15	25.96	39.91	59.10	118.68	162.28	286.82	1149.1	3376.4*
	10	7.36	9.97	30.06	49.17	76.33	113.73	229.92	314.99	558.05	2241.7	6591.4*
	14	10.56	21.92	79.84	132.11	206.47	308.97	627.47	860.75	1527.4	6146.5	18081.*
150	8	7.31	8.63	16.29	25.96	39.91	59.10	118.68	162.28	286.82	1149.1	3376.4*
	10	8.68	11.16	30.06	49.17	76.33	113.73	229.92	314.99	558.05	2241.7	6591.4*
	14	12.10	22.00	79.84	132.11	206.47	308.97	627.47	860.75	1527.4	6146.5	18081.*
200	8	8.30	9.67	16.69	25.97	39.91	59.10	118.68	162.28	286.82	1149.1	3376.4*
	10	9.83	12.28	30.07	49.17	76.33	113.73	229.92	314.99	558.05	2241.7	6591.4*
	14	13.49	22.30	79.84	132.11	206.47	308.97	627.47	860.75	1527.4	6146.5	18081.*
250	8	9.18	10.61	17.28	26.01	39.91	59.10	118.68	162.28	286.82	1149.1	3376.4*
	10	10.86	13.34	30.09	49.17	76.33	113.73	229.92	314.99	558.05	2241.7	6591.4*
	14	14.77	22.85	79.84	132.11	206.47	308.97	627.47	860.75	1527.4	6146.5	18081.*
300	8	9.99	11.48	17.95	26.13	39.91	59.10	118.68	162.28	286.82	1149.1	3376.4*
	10	11.80	14.32	30.16	49.17	76.33	113.73	229.92	314.99	558.05	2241.7	6591.4*
	14	15.95	23.56	79.84	132.11	206.47	308.97	627.47	860.75	1527.4	6146.5	18081.*
350	8	10.75	12.29	18.67	26.35	39.91	59.10	118.68	162.28	286.82	1149.1	3376.4*
	10	12.69	15.24	30.30	49.17	76.33	113.73	229.92	314.99	558.05	2241.7	6591.4*
	14	17.05	24.36	79.84	132.11	206.47	308.97	627.47	860.75	1527.4	6146.5	18081.*
400	8	11.46	13.05	19.39	26.66	39.92	59.10	118.68	162.28	286.82	1149.1	3376.4*
	10	13.52	16.12	30.53	49.17	76.33	113.73	229.92	314.99	558.05	2241.7	6591.4*
	14	18.09	25.20	79.84	132.11	206.47	308.97	627.47	860.75	1527.4	6146.5	18081.*
450	8	12.13	13.77	20.11	27.05	39.95	59.10	118.68	162.28	286.82	1149.1	3376.4*
	10	14.30	16.95	30.85	49.18	76.33	113.73	229.92	314.99	558.05	2241.7	6591.4*
	14	19.08	26.05	79.84	132.11	206.47	308.97	627.47	860.75	1527.4	6146.5	18081.*
500	8	12.78	14.46	20.82	27.50	40.01	59.10	118.68	162.28	286.82	1149.1	3376.4*
	10	15.05	17.75	31.24	49.19	76.33	113.73	229.92	314.99	558.05	2241.7	6591.4*
	14	20.02	26.90	79.84	132.11	206.47	308.97	627.47	860.75	1527.4	6146.5	18081.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 m (RADIUS = 5.7 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE
TIME INDEX

RATE
OF RISE

(m*s)^{1/2}

CEILING HEIGHT, m

°C/min

1

2

4

5

6

7

9

10

12

18

24

550	8	13.39	15.12	21.51	27.99	40.10	59.11	118.68	162.28	286.82	1149.1	3376.4*
	10	15.77	18.52	31.69	49.22	76.33	113.73	229.92	314.99	558.05	2241.7	6591.4*
	14	20.93	27.75	79.84	132.11	206.47	308.97	627.47	860.75	1527.4	6146.5	18081.*
600	8	13.99	15.76	22.19	28.51	40.22	59.11	118.68	162.28	286.82	1149.1	3376.4*
	10	16.47	19.26	32.18	49.26	76.33	113.73	229.92	314.99	558.05	2241.7	6591.4*
	14	21.80	28.58	79.84	132.11	206.47	308.97	627.47	860.75	1527.4	6146.5	18081.*
650	8	14.56	16.38	22.86	29.05	40.39	59.11	118.68	162.28	286.82	1149.1	3376.4*
	10	17.14	19.97	32.70	49.33	76.33	113.73	229.92	314.99	558.05	2241.7	6591.4*
	14	22.65	29.40	79.84	132.11	206.47	308.97	627.47	860.75	1527.4	6146.5	18081.*
700	8	15.12	16.97	23.51	29.60	40.60	59.12	118.68	162.28	286.82	1149.1	3376.4*
	10	17.78	20.66	33.25	49.43	76.33	113.73	229.92	314.99	558.05	2241.7	6591.4*
	14	23.46	30.21	79.84	132.11	206.47	308.97	627.47	860.75	1527.4	6146.5	18081.*
750	8	15.66	17.55	24.14	30.16	40.85	59.14	118.68	162.28	286.82	1149.1	3376.4*
	10	18.41	21.33	33.81	49.55	76.33	113.73	229.92	314.99	558.05	2241.7	6591.4*
	14	24.26	31.00	79.84	132.11	206.47	308.97	627.47	860.75	1527.4	6146.5	18081.*
800	8	16.18	18.11	24.76	30.72	41.13	59.17	118.68	162.28	286.82	1149.1	3376.4*
	10	19.02	21.99	34.38	49.71	76.33	113.73	229.92	314.99	558.05	2241.7	6591.4*
	14	25.03	31.78	79.85	132.11	206.47	308.97	627.47	860.75	1527.4	6146.5	18081.*
850	8	16.69	18.65	25.37	31.28	41.44	59.20	118.68	162.28	286.82	1149.1	3376.4*
	10	19.62	22.62	34.95	49.91	76.33	113.73	229.92	314.99	558.05	2241.7	6591.4*
	14	25.78	32.54	79.86	132.11	206.47	308.97	627.47	860.75	1527.4	6146.5	18081.*
900	8	17.19	19.19	25.97	31.84	41.78	59.25	118.68	162.28	286.82	1149.1	3376.4*
	10	20.20	23.24	35.53	50.13	76.34	113.73	229.92	314.99	558.05	2241.7	6591.4*
	14	26.51	33.29	79.88	132.11	206.47	308.97	627.47	860.75	1527.4	6146.5	18081.*
950	8	17.67	19.71	26.56	32.39	42.14	59.32	118.68	162.28	286.82	1149.1	3376.4*
	10	20.76	23.85	36.11	50.39	76.35	113.73	229.92	314.99	558.05	2241.7	6591.4*
	14	27.22	34.02	79.90	132.11	206.47	308.97	627.47	860.75	1527.4	6146.5	18081.*
1000	8	18.15	20.22	27.13	32.95	42.52	59.40	118.68	162.28	286.82	1149.1	3376.4*
	10	21.32	24.44	36.69	50.67	76.37	113.73	229.92	314.99	558.05	2241.7	6591.4*
	14	27.92	34.74	79.93	132.11	206.47	308.97	627.47	860.75	1527.4	6146.5	18081.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.5 m (RADIUS = 6.0 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	0.96	0.97	1.07	1.13	1.19	1.26	1.40	1.47	1.61	2.09	2.73*
	10	1.01	1.03	1.13	1.20	1.27	1.34	1.49	1.57	1.74	2.32	3.33*
	14	1.10	1.12	1.25	1.33	1.41	1.50	1.69	1.79	2.01	3.05	6.17*
100	8	1.13	1.14	1.26	1.33	1.41	1.49	1.65	1.73	1.90	2.46	3.18*
	10	1.20	1.22	1.35	1.43	1.52	1.60	1.78	1.88	2.07	2.75	3.77*
	14	1.34	1.37	1.52	1.62	1.72	1.83	2.05	2.17	2.44	3.51	6.21*
150	8	1.26	1.28	1.42	1.50	1.58	1.67	1.85	1.94	2.13	2.76	3.55*
	10	1.36	1.38	1.53	1.62	1.72	1.81	2.02	2.12	2.34	3.10	4.18*
	14	1.53	1.56	1.75	1.85	1.97	2.09	2.35	2.48	2.78	3.93	6.38*
200	8	1.38	1.40	1.55	1.64	1.73	1.83	2.02	2.12	2.33	3.01	3.88*
	10	1.49	1.52	1.69	1.78	1.89	2.00	2.22	2.34	2.58	3.40	4.55*
	14	1.69	1.74	1.94	2.06	2.18	2.32	2.60	2.75	3.07	4.30	6.66*
250	8	1.49	1.51	1.67	1.77	1.87	1.97	2.18	2.29	2.51	3.24	4.17*
	10	1.61	1.65	1.83	1.93	2.04	2.16	2.40	2.53	2.79	3.67	4.88*
	14	1.84	1.89	2.11	2.24	2.38	2.52	2.83	2.99	3.34	4.63	6.97*
300	8	1.58	1.61	1.78	1.88	1.99	2.10	2.33	2.44	2.68	3.46	4.44*
	10	1.72	1.76	1.95	2.07	2.19	2.31	2.57	2.70	2.98	3.92	5.19*
	14	1.98	2.03	2.27	2.41	2.56	2.71	3.04	3.21	3.58	4.94	7.30*
350	8	1.68	1.71	1.89	1.99	2.11	2.22	2.46	2.58	2.84	3.65	4.68*
	10	1.83	1.87	2.07	2.19	2.32	2.45	2.73	2.87	3.16	4.15	5.48*
	14	2.11	2.17	2.42	2.57	2.72	2.89	3.24	3.42	3.81	5.23	7.62*
400	8	1.76	1.80	1.99	2.10	2.22	2.34	2.59	2.72	2.98	3.84	4.92*
	10	1.93	1.97	2.19	2.31	2.45	2.59	2.87	3.02	3.33	4.36	5.75*
	14	2.23	2.29	2.56	2.72	2.88	3.05	3.42	3.61	4.02	5.50	7.93*
450	8	1.84	1.88	2.08	2.20	2.32	2.45	2.71	2.84	3.12	4.02	5.14*
	10	2.02	2.07	2.29	2.43	2.57	2.71	3.01	3.17	3.49	4.57	6.01*
	14	2.35	2.41	2.69	2.86	3.03	3.21	3.59	3.80	4.22	5.76	8.23*
500	8	1.92	1.96	2.17	2.29	2.42	2.55	2.83	2.97	3.25	4.18	5.35*
	10	2.11	2.16	2.40	2.54	2.68	2.83	3.15	3.31	3.65	4.77	6.26*
	14	2.46	2.53	2.82	2.99	3.17	3.36	3.76	3.97	4.42	6.01	8.53*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.5 m (RADIUS = 6.0 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	2.00	2.04	2.26	2.38	2.52	2.65	2.94	3.08	3.38	4.35	5.56*
	10	2.20	2.25	2.50	2.64	2.79	2.95	3.27	3.44	3.79	4.95	6.49*
	14	2.56	2.64	2.94	3.12	3.31	3.51	3.92	4.14	4.60	6.25	8.81*
600	8	2.07	2.11	2.34	2.47	2.61	2.75	3.04	3.19	3.50	4.50	5.75*
	10	2.28	2.34	2.59	2.74	2.90	3.06	3.40	3.57	3.94	5.13	6.72*
	14	2.66	2.74	3.06	3.24	3.44	3.64	4.08	4.30	4.78	6.48	9.09*
650	8	2.14	2.19	2.42	2.55	2.70	2.84	3.15	3.30	3.62	4.65	5.94*
	10	2.36	2.42	2.68	2.84	3.00	3.17	3.52	3.70	4.07	5.31	6.94*
	14	2.76	2.84	3.17	3.36	3.57	3.78	4.22	4.46	4.95	6.70	9.36*
700	8	2.21	2.26	2.50	2.64	2.78	2.93	3.25	3.41	3.74	4.80	6.12*
	10	2.44	2.50	2.77	2.93	3.10	3.27	3.63	3.82	4.21	5.48	7.15*
	14	2.86	2.94	3.28	3.48	3.69	3.91	4.37	4.61	5.12	6.91	9.62*
750	8	2.27	2.32	2.57	2.71	2.87	3.02	3.34	3.51	3.85	4.94	6.30*
	10	2.51	2.58	2.86	3.02	3.20	3.37	3.75	3.94	4.33	5.64	7.36*
	14	2.95	3.04	3.39	3.59	3.81	4.04	4.51	4.76	5.28	7.12	9.87*
800	8	2.34	2.39	2.64	2.79	2.95	3.11	3.44	3.61	3.96	5.07	6.47*
	10	2.59	2.65	2.94	3.11	3.29	3.47	3.85	4.05	4.46	5.80	7.56*
	14	3.04	3.13	3.49	3.70	3.93	4.16	4.65	4.90	5.44	7.32	10.12*
850	8	2.40	2.45	2.71	2.87	3.03	3.19	3.53	3.70	4.06	5.21	6.64*
	10	2.66	2.73	3.02	3.20	3.38	3.57	3.96	4.16	4.58	5.96	7.76*
	14	3.13	3.22	3.59	3.81	4.04	4.28	4.78	5.04	5.59	7.52	10.36*
900	8	2.46	2.52	2.78	2.94	3.10	3.27	3.62	3.80	4.16	5.34	6.80*
	10	2.73	2.80	3.10	3.28	3.47	3.66	4.06	4.27	4.70	6.11	7.95*
	14	3.22	3.31	3.69	3.92	4.15	4.39	4.91	5.18	5.74	7.71	10.60*
950	8	2.52	2.58	2.85	3.01	3.18	3.35	3.71	3.89	4.27	5.47	6.96*
	10	2.80	2.87	3.18	3.37	3.56	3.76	4.17	4.38	4.82	6.26	8.13*
	14	3.30	3.40	3.79	4.02	4.26	4.51	5.03	5.31	5.89	7.89	10.83*
1000	8	2.58	2.64	2.92	3.08	3.25	3.43	3.79	3.98	4.36	5.59	7.12*
	10	2.86	2.94	3.26	3.45	3.64	3.85	4.27	4.48	4.93	6.40	8.32*
	14	3.38	3.48	3.88	4.12	4.36	4.62	5.16	5.44	6.03	8.08	11.06*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.5 m (RADIUS = 6.0 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	1.52	1.55	1.74	1.86	1.99	2.13	2.44	2.62	3.06	6.49	16.03*
	10	1.63	1.67	1.90	2.05	2.20	2.38	2.81	3.09	3.91	11.13	29.50*
	14	1.83	1.91	2.23	2.45	2.71	3.03	4.08	5.02	7.95	27.74	77.63*
100	8	1.86	1.91	2.14	2.29	2.45	2.61	2.98	3.19	3.67	6.59	16.03*
	10	2.02	2.08	2.37	2.54	2.73	2.94	3.43	3.73	4.48	11.13	29.50*
	14	2.32	2.42	2.82	3.08	3.37	3.72	4.68	5.41	7.98	27.74	77.63*
150	8	2.13	2.19	2.47	2.63	2.81	3.00	3.41	3.64	4.16	6.90	16.03*
	10	2.33	2.41	2.74	2.94	3.16	3.39	3.94	4.25	5.03	11.14	29.50*
	14	2.71	2.83	3.29	3.58	3.90	4.28	5.26	5.94	8.16	27.74	77.63*
200	8	2.37	2.44	2.75	2.93	3.12	3.33	3.79	4.04	4.60	7.30	16.03*
	10	2.61	2.70	3.07	3.29	3.53	3.78	4.37	4.71	5.52	11.20	29.50*
	14	3.05	3.19	3.70	4.01	4.37	4.77	5.78	6.46	8.50	27.74	77.63*
250	8	2.58	2.66	3.00	3.19	3.41	3.63	4.12	4.39	4.98	7.71	16.04*
	10	2.85	2.96	3.36	3.60	3.86	4.13	4.76	5.12	5.96	11.35	29.50*
	14	3.36	3.51	4.06	4.40	4.78	5.21	6.27	6.95	8.90	27.74	77.63*
300	8	2.78	2.87	3.23	3.44	3.67	3.91	4.43	4.71	5.34	8.12	16.07*
	10	3.08	3.20	3.62	3.88	4.16	4.46	5.12	5.50	6.37	11.57	29.50*
	14	3.64	3.81	4.40	4.76	5.17	5.62	6.71	7.41	9.32	27.74	77.63*
350	8	2.97	3.06	3.44	3.67	3.91	4.16	4.72	5.02	5.68	8.51	16.14*
	10	3.30	3.42	3.87	4.15	4.44	4.76	5.46	5.85	6.76	11.84	29.50*
	14	3.90	4.08	4.71	5.10	5.52	5.99	7.13	7.84	9.74	27.74	77.63*
400	8	3.14	3.24	3.65	3.88	4.14	4.41	4.99	5.30	5.99	8.89	16.25*
	10	3.50	3.63	4.11	4.40	4.71	5.04	5.77	6.18	7.12	12.15	29.50*
	14	4.15	4.34	5.01	5.41	5.86	6.35	7.53	8.25	10.15	27.74	77.63*
450	8	3.31	3.41	3.84	4.09	4.36	4.64	5.24	5.57	6.29	9.26	16.40*
	10	3.69	3.82	4.33	4.63	4.96	5.30	6.07	6.50	7.47	12.47	29.50*
	14	4.39	4.59	5.29	5.71	6.17	6.69	7.90	8.64	10.55	27.74	77.63*
500	8	3.47	3.58	4.02	4.28	4.56	4.86	5.49	5.83	6.57	9.61	16.59*
	10	3.87	4.01	4.55	4.86	5.20	5.56	6.36	6.80	7.80	12.80	29.50*
	14	4.61	4.83	5.55	5.99	6.48	7.01	8.26	9.01	10.94	27.75	77.63*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.5 m (RADIUS = 6.0 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	3.62	3.74	4.20	4.47	4.76	5.07	5.72	6.08	6.84	9.94	16.81*	
	10	4.04	4.20	4.75	5.08	5.43	5.80	6.63	7.09	8.12	13.13	29.51*	
	14	4.83	5.05	5.81	6.27	6.77	7.32	8.61	9.37	11.31	27.76	77.63*	
600	8	3.77	3.89	4.37	4.65	4.95	5.27	5.95	6.31	7.11	10.27	17.05*	
	10	4.21	4.37	4.95	5.29	5.65	6.04	6.89	7.37	8.42	13.46	29.52*	
	14	5.04	5.27	6.06	6.53	7.05	7.61	8.94	9.72	11.68	27.78	77.63*	
650	8	3.91	4.04	4.53	4.83	5.14	5.46	6.17	6.54	7.36	10.59	17.30*	
	10	4.38	4.54	5.14	5.49	5.87	6.27	7.15	7.63	8.72	13.79	29.53*	
	14	5.24	5.48	6.29	6.78	7.32	7.90	9.26	10.06	12.04	27.81	77.63*	
700	8	4.04	4.18	4.69	5.00	5.32	5.65	6.38	6.76	7.60	10.90	17.57*	
	10	4.53	4.70	5.32	5.68	6.07	6.49	7.39	7.89	9.00	14.12	29.56*	
	14	5.43	5.68	6.52	7.03	7.58	8.18	9.57	10.38	12.39	27.85	77.63*	
750	8	4.18	4.32	4.85	5.16	5.49	5.84	6.58	6.98	7.84	11.20	17.84*	
	10	4.69	4.86	5.50	5.87	6.28	6.70	7.63	8.14	9.28	14.44	29.60*	
	14	5.62	5.88	6.75	7.27	7.83	8.45	9.87	10.70	12.73	27.91	77.63*	
800	8	4.31	4.45	5.00	5.32	5.66	6.02	6.78	7.19	8.07	11.49	18.12*	
	10	4.84	5.02	5.67	6.06	6.47	6.91	7.86	8.39	9.55	14.75	29.64*	
	14	5.81	6.07	6.96	7.50	8.08	8.71	10.16	11.01	13.06	27.98	77.63*	
850	8	4.43	4.58	5.15	5.47	5.82	6.19	6.97	7.39	8.30	11.78	18.40*	
	10	4.98	5.17	5.84	6.24	6.66	7.11	8.09	8.63	9.81	15.06	29.71*	
	14	5.99	6.26	7.18	7.72	8.32	8.96	10.45	11.31	13.38	28.07	77.63*	
900	8	4.56	4.71	5.29	5.63	5.98	6.36	7.16	7.59	8.51	12.06	18.68*	
	10	5.12	5.32	6.01	6.41	6.85	7.31	8.31	8.86	10.07	15.37	29.78*	
	14	6.16	6.44	7.38	7.94	8.55	9.21	10.72	11.60	13.70	28.18	77.63*	
950	8	4.68	4.84	5.43	5.77	6.14	6.53	7.35	7.79	8.73	12.33	18.97*	
	10	5.26	5.46	6.17	6.59	7.03	7.50	8.53	9.08	10.32	15.67	29.87*	
	14	6.34	6.62	7.59	8.16	8.78	9.46	10.99	11.88	14.01	28.30	77.63*	
1000	8	4.80	4.96	5.57	5.92	6.29	6.69	7.53	7.98	8.94	12.59	19.25*	
	10	5.40	5.60	6.33	6.75	7.21	7.69	8.74	9.31	10.56	15.97	29.98*	
	14	6.50	6.80	7.78	8.37	9.00	9.69	11.26	12.16	14.31	28.44	77.63*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.5 m (RADIUS = 6.0 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE
 TIME INDEX

RATE
 OF RISE

(m*s)^{1/2}

CEILING HEIGHT, m

	1	2	4	5	6	7	9	10	12	18	24
50	2.58 2.85 3.42	2.74 3.09 3.93	3.35 4.07 7.05	3.82 5.03 10.83	4.51 6.77 16.19	5.62 9.45 23.50	9.80 17.69 45.86	12.88 23.64 62.07	21.55 40.45 107.97	80.13 154.47 420.16	228.58* 444.06* 1214.1*
100	3.29 3.68 4.46	3.49 3.97 5.03	4.21 5.04 7.62	4.71 5.90 10.88	5.37 7.24 16.19	6.28 9.53 23.50	9.84 17.69 45.86	12.88 23.64 62.07	21.55 40.45 107.97	80.13 154.47 420.16	228.58* 444.06* 1214.1*
150	3.86 4.34 5.29	4.09 4.67 5.91	4.90 5.83 8.42	5.45 6.70 11.19	6.12 7.94 16.21	7.00 9.88 23.50	10.10 17.69 45.86	12.92 23.64 62.07	21.55 40.45 107.97	80.13 154.47 420.16	228.58* 444.06* 1214.1*
200	4.35 4.91 6.01	4.61 5.28 6.68	5.50 6.53 9.21	6.08 7.42 11.71	6.79 8.63 16.29	7.68 10.42 23.50	10.54 17.71 45.86	13.09 23.64 62.07	21.55 40.45 107.97	80.13 154.47 420.16	228.58* 444.06* 1214.1*
250	4.80 5.43 6.65	5.08 5.82 7.37	6.04 7.15 9.95	6.66 8.08 12.31	7.40 9.30 16.50	8.30 11.00 23.51	11.05 17.78 45.86	13.39 23.64 62.07	21.56 40.45 107.97	80.13 154.47 420.16	228.58* 444.06* 1214.1*
300	5.21 5.90 7.25	5.51 6.33 8.00	6.53 7.73 10.64	7.18 8.69 12.94	7.95 9.92 16.83	8.88 11.59 23.54	11.59 17.93 45.86	13.78 23.66 62.07	21.59 40.45 107.97	80.13 154.47 420.16	228.58* 444.06* 1214.1*
350	5.59 6.34 7.80	5.91 6.79 8.59	6.99 8.26 11.30	7.68 9.26 13.56	8.48 10.51 17.24	9.43 12.16 23.62	12.12 18.17 45.86	14.21 23.70 62.07	21.65 40.45 107.97	80.13 154.47 420.16	228.58* 444.06* 1214.1*
400	5.95 6.76 8.32	6.29 7.23 9.14	7.42 8.77 11.92	8.14 9.80 14.17	8.97 11.07 17.70	9.95 12.72 23.76	12.65 18.48 45.86	14.67 23.78 62.07	21.76 40.45 107.97	80.13 154.47 420.16	228.58* 444.06* 1214.1*
450	6.29 7.15 8.82	6.65 7.65 9.67	7.83 9.25 12.52	8.58 10.31 14.77	9.43 11.60 18.19	10.44 13.26 23.96	13.16 18.83 45.86	15.14 23.91 62.07	21.92 40.45 107.97	80.13 154.47 420.16	228.58* 444.06* 1214.1*
500	6.62 7.53 9.29	6.99 8.05 10.17	8.22 9.70 13.09	8.99 10.79 15.34	9.88 12.12 18.69	10.91 13.79 24.22	13.65 19.22 45.87	15.61 24.08 62.07	22.13 40.45 107.97	80.13 154.47 420.16	228.58* 444.06* 1214.1*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.5 m (RADIUS = 6.0 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550 (m*s) ^{1/2}	8	6.93	7.32	8.60	9.40	10.31	11.36	14.13	16.07	22.39	80.13	228.58*	
	10	7.89	8.43	10.14	11.26	12.61	14.30	19.63	24.31	40.45	154.47	444.06*	
	14	9.74	10.65	13.63	15.90	19.20	24.52	45.87	62.07	107.97	420.16	1214.1*	
600	8	7.23	7.64	8.96	9.78	10.72	11.79	14.60	16.53	22.67	80.13	228.58*	
	10	8.24	8.80	10.56	11.71	13.08	14.79	20.05	24.57	40.46	154.47	444.06*	
	14	10.18	11.12	14.16	16.45	19.71	24.86	45.87	62.07	107.97	420.16	1214.1*	
650	8	7.52	7.94	9.31	10.15	11.11	12.21	15.05	16.98	22.98	80.13	228.58*	
	10	8.58	9.15	10.97	12.14	13.54	15.26	20.47	24.86	40.47	154.47	444.06*	
	14	10.60	11.56	14.67	16.97	20.21	25.22	45.88	62.07	107.97	420.16	1214.1*	
700	8	7.81	8.24	9.65	10.51	11.50	12.62	15.49	17.42	23.31	80.13	228.58*	
	10	8.91	9.50	11.36	12.56	13.99	15.73	20.90	25.17	40.50	154.47	444.06*	
	14	11.01	11.99	15.17	17.49	20.71	25.61	45.89	62.07	107.97	420.16	1214.1*	
750	8	8.08	8.53	9.97	10.86	11.87	13.02	15.92	17.86	23.65	80.13	228.58*	
	10	9.22	9.83	11.75	12.97	14.42	16.18	21.33	25.50	40.53	154.47	444.06*	
	14	11.40	12.41	15.65	17.99	21.20	26.01	45.91	62.07	107.97	420.16	1214.1*	
800	8	8.35	8.81	10.29	11.20	12.23	13.40	16.34	18.28	24.01	80.13	228.58*	
	10	9.53	10.16	12.12	13.37	14.84	16.62	21.76	25.85	40.57	154.47	444.06*	
	14	11.79	12.82	16.11	18.48	21.69	26.41	45.94	62.07	107.97	420.16	1214.1*	
850	8	8.61	9.08	10.60	11.53	12.58	13.78	16.75	18.70	24.36	80.13	228.58*	
	10	9.83	10.47	12.48	13.76	15.25	17.05	22.19	26.21	40.63	154.47	444.06*	
	14	12.16	13.22	16.57	18.96	22.16	26.83	45.98	62.08	107.97	420.16	1214.1*	
900	8	8.86	9.35	10.90	11.86	12.93	14.14	17.16	19.11	24.73	80.13	228.58*	
	10	10.13	10.78	12.83	14.13	15.65	17.47	22.61	26.57	40.70	154.47	444.06*	
	14	12.53	13.61	17.01	19.42	22.63	27.25	46.03	62.08	107.97	420.16	1214.1*	
950	8	9.11	9.61	11.20	12.17	13.26	14.50	17.55	19.51	25.09	80.13	228.58*	
	10	10.41	11.08	13.18	14.50	16.05	17.88	23.03	26.94	40.80	154.47	444.06*	
	14	12.89	13.98	17.45	19.88	23.10	27.67	46.10	62.08	107.97	420.16	1214.1*	
1000	8	9.35	9.86	11.49	12.48	13.59	14.85	17.93	19.91	25.46	80.13	228.58*	
	10	10.69	11.38	13.51	14.86	16.43	18.29	23.44	27.31	40.90	154.47	444.06*	
	14	13.24	14.35	17.87	20.33	23.55	28.09	46.18	62.09	107.97	420.16	1214.1*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.5 m (RADIUS = 6.0 m)
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	5.17	6.78	18.93	30.24	46.14	67.83	134.38	182.66	319.46	1250.8	3620.5*
	10	6.31	10.64	35.47	57.48	88.44	130.72	260.54	354.74	621.76	2440.3	7068.0*
	14	10.55	26.56	94.57	154.82	239.64	355.50	711.40	969.75	1702.1	6691.3	19389.*
100	8	6.69	8.19	18.93	30.24	46.14	67.83	134.38	182.66	319.46	1250.8	3620.5*
	10	8.04	11.36	35.47	57.48	88.44	130.72	260.54	354.74	621.76	2440.3	7068.0*
	14	11.97	26.56	94.57	154.82	239.64	355.50	711.40	969.75	1702.1	6691.3	19389.*
150	8	7.91	9.43	18.99	30.24	46.14	67.83	134.38	182.66	319.46	1250.8	3620.5*
	10	9.46	12.49	35.47	57.48	88.44	130.72	260.54	354.74	621.76	2440.3	7068.0*
	14	13.53	26.57	94.57	154.82	239.64	355.50	711.40	969.75	1702.1	6691.3	19389.*
200	8	8.97	10.54	19.22	30.24	46.14	67.83	134.38	182.66	319.46	1250.8	3620.5*
	10	10.69	13.64	35.47	57.48	88.44	130.72	260.54	354.74	621.76	2440.3	7068.0*
	14	14.99	26.69	94.57	154.82	239.64	355.50	711.40	969.75	1702.1	6691.3	19389.*
250	8	9.92	11.54	19.66	30.25	46.14	67.83	134.38	182.66	319.46	1250.8	3620.5*
	10	11.80	14.73	35.47	57.48	88.44	130.72	260.54	354.74	621.76	2440.3	7068.0*
	14	16.33	27.00	94.57	154.82	239.64	355.50	711.40	969.75	1702.1	6691.3	19389.*
300	8	10.79	12.46	20.23	30.30	46.14	67.83	134.38	182.66	319.46	1250.8	3620.5*
	10	12.82	15.76	35.49	57.48	88.44	130.72	260.54	354.74	621.76	2440.3	7068.0*
	14	17.58	27.51	94.57	154.82	239.64	355.50	711.40	969.75	1702.1	6691.3	19389.*
350	8	11.60	13.32	20.88	30.41	46.14	67.83	134.38	182.66	319.46	1250.8	3620.5*
	10	13.77	16.73	35.55	57.48	88.44	130.72	260.54	354.74	621.76	2440.3	7068.0*
	14	18.76	28.15	94.57	154.82	239.64	355.50	711.40	969.75	1702.1	6691.3	19389.*
400	8	12.37	14.14	21.57	30.60	46.14	67.83	134.38	182.66	319.46	1250.8	3620.5*
	10	14.66	17.66	35.66	57.48	88.44	130.72	260.54	354.74	621.76	2440.3	7068.0*
	14	19.87	28.89	94.57	154.82	239.64	355.50	711.40	969.75	1702.1	6691.3	19389.*
450	8	13.09	14.91	22.28	30.87	46.15	67.83	134.38	182.66	319.46	1250.8	3620.5*
	10	15.50	18.54	35.84	57.48	88.44	130.72	260.54	354.74	621.76	2440.3	7068.0*
	14	20.93	29.67	94.57	154.82	239.64	355.50	711.40	969.75	1702.1	6691.3	19389.*
500	8	13.79	15.65	22.98	31.21	46.17	67.83	134.38	182.66	319.46	1250.8	3620.5*
	10	16.31	19.39	36.10	57.48	88.44	130.72	260.54	354.74	621.76	2440.3	7068.0*
	14	21.94	30.49	94.57	154.82	239.64	355.50	711.40	969.75	1702.1	6691.3	19389.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.5 m (RADIUS = 6.0 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	14.45	16.35	23.69	31.61	46.21	67.83	134.38	182.66	319.46	1250.8	3620.5*
	10	17.09	20.20	36.42	57.49	88.44	130.72	260.54	354.74	621.76	2440.3	7068.0*
	14	22.92	31.31	94.57	154.82	239.64	355.50	711.40	969.75	1702.1	6691.3	19389.*
600	8	15.09	17.03	24.38	32.05	46.27	67.83	134.38	182.66	319.46	1250.8	3620.5*
	10	17.83	20.99	36.80	57.50	88.44	130.72	260.54	354.74	621.76	2440.3	7068.0*
	14	23.85	32.14	94.57	154.82	239.64	355.50	711.40	969.75	1702.1	6691.3	19389.*
650	8	15.70	17.69	25.06	32.53	46.35	67.83	134.38	182.66	319.46	1250.8	3620.5*
	10	18.55	21.75	37.23	57.53	88.44	130.72	260.54	354.74	621.76	2440.3	7068.0*
	14	24.76	32.97	94.57	154.82	239.64	355.50	711.40	969.75	1702.1	6691.3	19389.*
700	8	16.30	18.33	25.73	33.03	46.48	67.83	134.38	182.66	319.46	1250.8	3620.5*
	10	19.25	22.49	37.69	57.57	88.44	130.72	260.54	354.74	621.76	2440.3	7068.0*
	14	25.63	33.79	94.57	154.82	239.64	355.50	711.40	969.75	1702.1	6691.3	19389.*
750	8	16.88	18.94	26.39	33.55	46.63	67.84	134.38	182.66	319.46	1250.8	3620.5*
	10	19.92	23.20	38.19	57.62	88.44	130.72	260.54	354.74	621.76	2440.3	7068.0*
	14	26.48	34.59	94.57	154.82	239.64	355.50	711.40	969.75	1702.1	6691.3	19389.*
800	8	17.44	19.54	27.03	34.09	46.82	67.85	134.38	182.66	319.46	1250.8	3620.5*
	10	20.58	23.90	38.70	57.70	88.44	130.72	260.54	354.74	621.76	2440.3	7068.0*
	14	27.31	35.39	94.57	154.82	239.64	355.50	711.40	969.75	1702.1	6691.3	19389.*
850	8	17.99	20.13	27.66	34.63	47.04	67.86	134.38	182.66	319.46	1250.8	3620.5*
	10	21.22	24.58	39.24	57.80	88.45	130.72	260.54	354.74	621.76	2440.3	7068.0*
	14	28.12	36.18	94.57	154.82	239.64	355.50	711.40	969.75	1702.1	6691.3	19389.*
900	8	18.53	20.70	28.29	35.18	47.29	67.88	134.38	182.66	319.46	1250.8	3620.5*
	10	21.84	25.24	39.78	57.93	88.45	130.72	260.54	354.74	621.76	2440.3	7068.0*
	14	28.90	36.95	94.57	154.82	239.64	355.50	711.40	969.75	1702.1	6691.3	19389.*
950	8	19.05	21.25	28.90	35.73	47.57	67.91	134.38	182.66	319.46	1250.8	3620.5*
	10	22.45	25.89	40.33	58.09	88.45	130.72	260.54	354.74	621.76	2440.3	7068.0*
	14	29.67	37.72	94.58	154.82	239.64	355.50	711.40	969.75	1702.1	6691.3	19389.*
1000	8	19.56	21.80	29.50	36.28	47.88	67.94	134.38	182.66	319.46	1250.8	3620.5*
	10	23.04	26.52	40.89	58.27	88.45	130.72	260.54	354.74	621.76	2440.3	7068.0*
	14	30.42	38.47	94.59	154.82	239.64	355.50	711.40	969.75	1702.1	6691.3	19389.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.0 m (RADIUS = 6.4 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	1.02	1.02	1.12	1.18	1.24	1.31	1.44	1.51	1.66	2.14	2.79*
	10	1.07	1.08	1.18	1.25	1.32	1.39	1.54	1.62	1.79	2.39	3.44*
	14	1.17	1.18	1.31	1.39	1.47	1.56	1.75	1.85	2.08	3.18	6.53*
100	8	1.19	1.20	1.32	1.39	1.46	1.54	1.70	1.79	1.96	2.52	3.25*
	10	1.27	1.29	1.42	1.49	1.58	1.66	1.85	1.94	2.14	2.83	3.88*
	14	1.42	1.44	1.60	1.69	1.79	1.90	2.13	2.26	2.53	3.65	6.55*
150	8	1.34	1.35	1.48	1.56	1.65	1.73	1.91	2.01	2.20	2.83	3.63*
	10	1.44	1.46	1.60	1.69	1.79	1.88	2.09	2.20	2.42	3.19	4.29*
	14	1.62	1.65	1.83	1.94	2.06	2.18	2.44	2.58	2.88	4.07	6.69*
200	8	1.46	1.48	1.62	1.71	1.80	1.90	2.10	2.20	2.41	3.10	3.96*
	10	1.58	1.61	1.77	1.86	1.97	2.08	2.30	2.42	2.66	3.50	4.66*
	14	1.80	1.83	2.03	2.15	2.28	2.42	2.71	2.86	3.19	4.45	6.94*
250	8	1.57	1.60	1.75	1.85	1.94	2.05	2.26	2.37	2.60	3.34	4.25*
	10	1.71	1.74	1.91	2.02	2.13	2.25	2.49	2.62	2.88	3.78	5.00*
	14	1.96	2.00	2.22	2.35	2.49	2.63	2.94	3.11	3.46	4.80	7.24*
300	8	1.68	1.70	1.87	1.97	2.08	2.18	2.41	2.53	2.77	3.56	4.53*
	10	1.83	1.86	2.05	2.16	2.28	2.41	2.67	2.80	3.08	4.04	5.31*
	14	2.10	2.15	2.38	2.52	2.67	2.83	3.16	3.34	3.72	5.12	7.56*
350	8	1.78	1.80	1.98	2.09	2.20	2.31	2.55	2.68	2.93	3.76	4.78*
	10	1.94	1.98	2.18	2.30	2.42	2.56	2.83	2.97	3.27	4.28	5.61*
	14	2.24	2.29	2.54	2.69	2.85	3.01	3.37	3.55	3.95	5.42	7.88*
400	8	1.87	1.90	2.08	2.19	2.31	2.43	2.69	2.82	3.08	3.95	5.02*
	10	2.05	2.08	2.30	2.42	2.56	2.69	2.98	3.14	3.45	4.50	5.88*
	14	2.37	2.42	2.69	2.85	3.01	3.19	3.56	3.76	4.17	5.70	8.19*
450	8	1.95	1.99	2.18	2.30	2.42	2.55	2.81	2.95	3.23	4.14	5.25*
	10	2.15	2.19	2.41	2.54	2.68	2.83	3.13	3.29	3.62	4.71	6.15*
	14	2.49	2.55	2.83	2.99	3.17	3.35	3.74	3.95	4.39	5.97	8.49*
500	8	2.04	2.07	2.28	2.40	2.53	2.66	2.93	3.08	3.37	4.31	5.46*
	10	2.24	2.28	2.52	2.66	2.80	2.95	3.27	3.44	3.78	4.92	6.40*
	14	2.61	2.67	2.96	3.14	3.32	3.51	3.92	4.13	4.59	6.22	8.79*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.0 m (RADIUS = 6.4 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	2.12	2.15	2.37	2.49	2.63	2.76	3.05	3.20	3.50	4.48	5.67*	
	10	2.33	2.38	2.62	2.77	2.92	3.08	3.40	3.58	3.93	5.11	6.64*	
	14	2.72	2.79	3.09	3.27	3.46	3.66	4.08	4.31	4.78	6.47	9.08*	
600	8	2.20	2.23	2.45	2.58	2.72	2.86	3.16	3.31	3.63	4.64	5.87*	
	10	2.42	2.47	2.72	2.87	3.03	3.19	3.53	3.71	4.08	5.30	6.87*	
	14	2.83	2.90	3.22	3.40	3.60	3.81	4.25	4.48	4.96	6.71	9.35*	
650	8	2.27	2.31	2.54	2.67	2.82	2.96	3.27	3.43	3.75	4.79	6.06*	
	10	2.51	2.56	2.82	2.97	3.14	3.31	3.66	3.84	4.22	5.48	7.10*	
	14	2.94	3.01	3.34	3.53	3.73	3.95	4.40	4.64	5.14	6.93	9.63*	
700	8	2.34	2.38	2.62	2.76	2.91	3.06	3.37	3.54	3.87	4.94	6.25*	
	10	2.59	2.64	2.91	3.07	3.24	3.41	3.78	3.97	4.36	5.65	7.31*	
	14	3.04	3.11	3.45	3.65	3.86	4.09	4.55	4.80	5.32	7.15	9.89*	
750	8	2.41	2.46	2.70	2.84	2.99	3.15	3.47	3.64	3.98	5.09	6.43*	
	10	2.67	2.73	3.00	3.17	3.34	3.52	3.90	4.09	4.49	5.82	7.52*	
	14	3.14	3.22	3.56	3.77	3.99	4.22	4.70	4.95	5.48	7.37	10.15*	
800	8	2.48	2.53	2.78	2.92	3.08	3.24	3.57	3.74	4.10	5.23	6.60*	
	10	2.75	2.81	3.09	3.26	3.44	3.62	4.01	4.21	4.62	5.99	7.73*	
	14	3.23	3.32	3.67	3.89	4.11	4.35	4.84	5.10	5.65	7.58	10.40*	
850	8	2.55	2.60	2.85	3.00	3.16	3.33	3.67	3.85	4.21	5.37	6.77*	
	10	2.83	2.89	3.18	3.35	3.54	3.73	4.12	4.33	4.75	6.15	7.93*	
	14	3.33	3.41	3.78	4.00	4.23	4.47	4.98	5.25	5.81	7.78	10.65*	
900	8	2.61	2.66	2.92	3.08	3.24	3.41	3.76	3.94	4.31	5.50	6.94*	
	10	2.90	2.96	3.26	3.44	3.63	3.82	4.23	4.44	4.87	6.31	8.12*	
	14	3.42	3.51	3.89	4.11	4.35	4.59	5.11	5.39	5.96	7.98	10.89*	
950	8	2.68	2.73	3.00	3.16	3.32	3.50	3.85	4.04	4.42	5.63	7.10*	
	10	2.97	3.04	3.35	3.53	3.72	3.92	4.34	4.55	4.99	6.46	8.31*	
	14	3.51	3.60	3.99	4.22	4.46	4.71	5.25	5.53	6.11	8.17	11.12*	
1000	8	2.74	2.79	3.07	3.23	3.40	3.58	3.94	4.13	4.52	5.76	7.26*	
	10	3.04	3.11	3.43	3.61	3.81	4.01	4.44	4.66	5.11	6.61	8.50*	
	14	3.60	3.69	4.09	4.32	4.57	4.83	5.38	5.66	6.26	8.36	11.36*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.0 m (RADIUS = 6.4 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX
RATE OF RISE

CEILING HEIGHT, m

(m*s)^{1/2}

°C/min

1

2

4

5

6

7

9

10

12

18

24

50

8
10
14

1.61

1.64

1.83

1.95

2.08

2.22

2.54

2.73

3.20

6.93

17.06*

100

8
10
14

1.97

2.01

2.25

2.40

2.56

2.73

3.11

3.32

3.82

7.01

17.06*

150

8
10
14

2.26

2.32

2.59

2.76

2.94

3.13

3.56

3.80

4.34

7.28

17.06*

200

8
10
14

2.52

2.58

2.89

3.07

3.27

3.48

3.95

4.21

4.79

7.67

17.06*

250

8
10
14

2.74

2.82

3.15

3.35

3.57

3.80

4.30

4.58

5.19

8.08

17.06*

300

8
10
14

2.96

3.04

3.39

3.61

3.84

4.09

4.62

4.91

5.56

8.49

17.08*

350

8
10
14

3.15

3.24

3.62

3.85

4.10

4.36

4.92

5.23

5.91

8.89

17.13*

400

8
10
14

3.34

3.43

3.84

4.08

4.34

4.61

5.20

5.53

6.24

9.28

17.21*

450

8
10
14

3.52

3.62

4.04

4.29

4.56

4.85

5.47

5.81

6.55

9.65

17.33*

500

8
10
14

3.69

3.79

4.23

4.50

4.78

5.08

5.73

6.08

6.84

10.01

17.49*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.0 m (RADIUS = 6.4 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
		(m*s) ^{1/2}											
550	8	3.85	3.96	4.42	4.70	4.99	5.30	5.97	6.34	7.13	10.36	17.68*	
	10	4.30	4.45	5.01	5.34	5.70	6.09	6.94	7.41	8.48	13.83	31.49*	
	14	5.15	5.37	6.14	6.61	7.13	7.70	9.06	9.87	11.95	30.04	83.03*	
600	8	4.00	4.12	4.60	4.89	5.19	5.51	6.21	6.58	7.40	10.69	17.89*	
	10	4.48	4.63	5.21	5.56	5.93	6.33	7.21	7.70	8.80	14.16	31.49*	
	14	5.37	5.60	6.40	6.89	7.42	8.02	9.40	10.23	12.33	30.05	83.03*	
650	8	4.16	4.28	4.77	5.07	5.39	5.72	6.44	6.82	7.66	11.02	18.13*	
	10	4.66	4.81	5.42	5.77	6.16	6.57	7.48	7.98	9.11	14.49	31.50*	
	14	5.58	5.82	6.65	7.15	7.71	8.32	9.74	10.58	12.70	30.07	83.03*	
700	8	4.30	4.43	4.94	5.25	5.57	5.92	6.66	7.05	7.92	11.34	18.38*	
	10	4.83	4.99	5.61	5.98	6.38	6.80	7.73	8.25	9.40	14.82	31.52*	
	14	5.79	6.04	6.90	7.41	7.98	8.61	10.06	10.92	13.06	30.10	83.03*	
750	8	4.44	4.57	5.11	5.42	5.76	6.11	6.87	7.28	8.16	11.65	18.64*	
	10	4.99	5.16	5.80	6.18	6.59	7.03	7.98	8.51	9.69	15.14	31.54*	
	14	5.99	6.25	7.13	7.66	8.25	8.89	10.38	11.25	13.41	30.14	83.03*	
800	8	4.58	4.72	5.26	5.59	5.93	6.30	7.08	7.50	8.40	11.95	18.90*	
	10	5.15	5.32	5.98	6.37	6.80	7.24	8.23	8.77	9.97	15.46	31.57*	
	14	6.19	6.45	7.36	7.91	8.51	9.16	10.68	11.57	13.75	30.19	83.03*	
850	8	4.72	4.86	5.42	5.75	6.11	6.48	7.28	7.71	8.64	12.25	19.18*	
	10	5.30	5.48	6.16	6.56	7.00	7.46	8.46	9.02	10.24	15.78	31.62*	
	14	6.38	6.65	7.59	8.15	8.76	9.43	10.98	11.88	14.09	30.26	83.03*	
900	8	4.85	4.99	5.57	5.91	6.28	6.66	7.48	7.92	8.86	12.53	19.45*	
	10	5.46	5.64	6.34	6.75	7.19	7.66	8.69	9.26	10.51	16.09	31.67*	
	14	6.57	6.85	7.80	8.38	9.01	9.69	11.27	12.19	14.41	30.34	83.03*	
950	8	4.98	5.13	5.72	6.07	6.44	6.83	7.67	8.12	9.09	12.81	19.73*	
	10	5.60	5.79	6.51	6.93	7.38	7.87	8.92	9.49	10.77	16.40	31.74*	
	14	6.75	7.04	8.02	8.61	9.25	9.95	11.55	12.49	14.73	30.44	83.03*	
1000	8	5.11	5.26	5.86	6.22	6.60	7.00	7.86	8.32	9.31	13.09	20.01*	
	10	5.75	5.94	6.67	7.11	7.57	8.06	9.14	9.73	11.03	16.70	31.82*	
	14	6.93	7.22	8.23	8.83	9.48	10.20	11.83	12.78	15.05	30.55	83.03*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.0 m (RADIUS = 6.4 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	2.75	2.91	3.57	4.10	4.89	6.22	10.91	14.30	23.80	86.93	244.68*
	10	3.05	3.30	4.41	5.56	7.64	10.66	19.82	26.38	44.79	167.72	475.47*
	14	3.67	4.26	8.11	12.47	18.54	26.76	51.65	69.55	119.84	456.46	1300.2*
100	8	3.50	3.71	4.48	5.02	5.75	6.79	10.93	14.30	23.80	86.93	244.68*
	10	3.93	4.24	5.40	6.39	7.98	10.70	19.82	26.38	44.79	167.72	475.47*
	14	4.78	5.42	8.52	12.48	18.54	26.76	51.65	69.55	119.84	456.46	1300.2*
150	8	4.11	4.35	5.21	5.79	6.53	7.51	11.10	14.32	23.80	86.93	244.68*
	10	4.63	4.98	6.24	7.21	8.63	10.95	19.82	26.38	44.79	167.72	475.47*
	14	5.67	6.36	9.27	12.67	18.55	26.76	51.65	69.55	119.84	456.46	1300.2*
200	8	4.64	4.91	5.84	6.46	7.23	8.20	11.47	14.43	23.80	86.93	244.68*
	10	5.25	5.63	6.97	7.96	9.33	11.41	19.83	26.38	44.79	167.72	475.47*
	14	6.44	7.18	10.06	13.08	18.58	26.76	51.65	69.55	119.84	456.46	1300.2*
250	8	5.12	5.41	6.41	7.07	7.86	8.85	11.95	14.65	23.80	86.93	244.68*
	10	5.80	6.21	7.63	8.65	10.00	11.96	19.86	26.38	44.79	167.72	475.47*
	14	7.14	7.91	10.81	13.62	18.70	26.76	51.65	69.55	119.84	456.46	1300.2*
300	8	5.55	5.86	6.93	7.62	8.44	9.45	12.47	14.99	23.81	86.93	244.68*
	10	6.30	6.75	8.24	9.29	10.65	12.54	19.95	26.39	44.79	167.72	475.47*
	14	7.77	8.58	11.53	14.22	18.93	26.77	51.65	69.55	119.84	456.46	1300.2*
350	8	5.96	6.29	7.42	8.14	8.99	10.02	13.00	15.39	23.85	86.93	244.68*
	10	6.78	7.25	8.81	9.88	11.26	13.12	20.12	26.41	44.79	167.72	475.47*
	14	8.36	9.21	12.22	14.84	19.26	26.81	51.65	69.55	119.84	456.46	1300.2*
400	8	6.35	6.69	7.87	8.63	9.51	10.56	13.53	15.82	23.92	86.93	244.68*
	10	7.22	7.71	9.34	10.45	11.84	13.69	20.36	26.45	44.79	167.72	475.47*
	14	8.92	9.80	12.87	15.45	19.65	26.89	51.65	69.55	119.84	456.46	1300.2*
450	8	6.71	7.08	8.31	9.09	10.00	11.07	14.05	16.28	24.03	86.93	244.68*
	10	7.64	8.16	9.85	10.98	12.40	14.24	20.66	26.53	44.79	167.72	475.47*
	14	9.45	10.36	13.49	16.05	20.09	27.01	51.65	69.55	119.84	456.46	1300.2*
500	8	7.06	7.44	8.72	9.53	10.47	11.57	14.55	16.74	24.19	86.93	244.68*
	10	8.05	8.58	10.33	11.50	12.93	14.78	21.00	26.65	44.79	167.72	475.47*
	14	9.96	10.90	14.09	16.64	20.56	27.19	51.65	69.55	119.84	456.46	1300.2*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.0 m (RADIUS = 6.4 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	7.39	7.79	9.12	9.95	10.91	12.04	15.05	17.20	24.39	86.93	244.68*	
	10	8.43	8.99	10.79	11.99	13.45	15.30	21.38	26.82	44.80	167.72	475.47*	
	14	10.44	11.41	14.67	17.22	21.05	27.42	51.65	69.55	119.84	456.46	1300.2*	
600	8	7.72	8.13	9.50	10.36	11.35	12.49	15.53	17.66	24.63	86.93	244.68*	
	10	8.81	9.38	11.24	12.46	13.95	15.81	21.77	27.02	44.80	167.72	475.47*	
	14	10.91	11.91	15.22	17.78	21.55	27.69	51.66	69.55	119.84	456.46	1300.2*	
650	8	8.03	8.45	9.87	10.75	11.76	12.93	16.00	18.12	24.91	86.93	244.68*	
	10	9.17	9.76	11.67	12.92	14.43	16.31	22.18	27.26	44.80	167.72	475.47*	
	14	11.36	12.38	15.76	18.33	22.04	27.99	51.66	69.55	119.84	456.46	1300.2*	
700	8	8.33	8.77	10.23	11.13	12.17	13.36	16.45	18.57	25.20	86.93	244.68*	
	10	9.52	10.13	12.09	13.36	14.90	16.79	22.60	27.53	44.81	167.72	475.47*	
	14	11.79	12.84	16.28	18.86	22.54	28.33	51.66	69.55	119.84	456.46	1300.2*	
750	8	8.62	9.08	10.57	11.50	12.56	13.78	16.90	19.01	25.52	86.93	244.68*	
	10	9.85	10.48	12.49	13.79	15.35	17.26	23.02	27.82	44.83	167.72	475.47*	
	14	12.21	13.29	16.79	19.38	23.04	28.69	51.67	69.55	119.84	456.46	1300.2*	
800	8	8.91	9.37	10.91	11.86	12.94	14.18	17.33	19.45	25.85	86.93	244.68*	
	10	10.18	10.83	12.88	14.21	15.79	17.72	23.45	28.14	44.85	167.72	475.47*	
	14	12.63	13.72	17.28	19.89	23.53	29.06	51.68	69.55	119.84	456.46	1300.2*	
850	8	9.18	9.66	11.24	12.21	13.31	14.57	17.76	19.88	26.19	86.93	244.68*	
	10	10.50	11.16	13.27	14.62	16.22	18.17	23.87	28.47	44.89	167.72	475.47*	
	14	13.03	14.15	17.76	20.39	24.02	29.45	51.70	69.55	119.84	456.46	1300.2*	
900	8	9.46	9.95	11.56	12.55	13.67	14.95	18.18	20.30	26.54	86.93	244.68*	
	10	10.82	11.49	13.64	15.02	16.64	18.61	24.30	28.81	44.93	167.72	475.47*	
	14	13.42	14.56	18.23	20.88	24.50	29.85	51.73	69.55	119.84	456.46	1300.2*	
950	8	9.72	10.22	11.87	12.88	14.03	15.33	18.59	20.71	26.90	86.93	244.68*	
	10	11.12	11.81	14.00	15.41	17.05	19.04	24.72	29.16	44.99	167.72	475.47*	
	14	13.80	14.96	18.69	21.36	24.97	30.25	51.76	69.55	119.84	456.46	1300.2*	
1000	8	9.98	10.49	12.17	13.21	14.37	15.69	18.99	21.12	27.26	86.93	244.68*	
	10	11.42	12.13	14.36	15.78	17.46	19.46	25.13	29.52	45.06	167.72	475.47*	
	14	14.17	15.36	19.14	21.83	25.44	30.66	51.81	69.55	119.84	456.46	1300.2*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.0 m (RADIUS = 6.4 m)
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	5.60	7.63	22.09	35.05	53.09	77.50	151.60	204.91	354.82	1359.1	3877.5*
	10	6.96	12.61	41.59	66.82	101.97	149.56	294.13	398.16	690.79	2651.8	7570.1*
	14	12.54	31.92	111.27	180.35	276.66	407.11	803.49	1088.8	1891.5	7271.6	20767.*
100	8	7.23	9.01	22.09	35.05	53.09	77.50	151.60	204.91	354.82	1359.1	3877.5*
	10	8.79	13.06	41.59	66.82	101.97	149.56	294.13	398.16	690.79	2651.8	7570.1*
	14	13.65	31.92	111.27	180.35	276.66	407.11	803.49	1088.8	1891.5	7271.6	20767.*
150	8	8.54	10.30	22.11	35.05	53.09	77.50	151.60	204.91	354.82	1359.1	3877.5*
	10	10.29	14.06	41.59	66.82	101.97	149.56	294.13	398.16	690.79	2651.8	7570.1*
	14	15.17	31.92	111.27	180.35	276.66	407.11	803.49	1088.8	1891.5	7271.6	20767.*
200	8	9.67	11.47	22.22	35.05	53.09	77.50	151.60	204.91	354.82	1359.1	3877.5*
	10	11.61	15.18	41.59	66.82	101.97	149.56	294.13	398.16	690.79	2651.8	7570.1*
	14	16.66	31.95	111.27	180.35	276.66	407.11	803.49	1088.8	1891.5	7271.6	20767.*
250	8	10.69	12.53	22.49	35.05	53.09	77.50	151.60	204.91	354.82	1359.1	3877.5*
	10	12.79	16.28	41.59	66.82	101.97	149.56	294.13	398.16	690.79	2651.8	7570.1*
	14	18.06	32.08	111.27	180.35	276.66	407.11	803.49	1088.8	1891.5	7271.6	20767.*
300	8	11.62	13.51	22.93	35.07	53.09	77.50	151.60	204.91	354.82	1359.1	3877.5*
	10	13.88	17.35	41.59	66.82	101.97	149.56	294.13	398.16	690.79	2651.8	7570.1*
	14	19.38	32.37	111.27	180.35	276.66	407.11	803.49	1088.8	1891.5	7271.6	20767.*
350	8	12.49	14.42	23.48	35.11	53.09	77.50	151.60	204.91	354.82	1359.1	3877.5*
	10	14.90	18.36	41.61	66.82	101.97	149.56	294.13	398.16	690.79	2651.8	7570.1*
	14	20.62	32.80	111.27	180.35	276.66	407.11	803.49	1088.8	1891.5	7271.6	20767.*
400	8	13.31	15.29	24.10	35.21	53.09	77.50	151.60	204.91	354.82	1359.1	3877.5*
	10	15.85	19.33	41.65	66.82	101.97	149.56	294.13	398.16	690.79	2651.8	7570.1*
	14	21.80	33.37	111.27	180.35	276.66	407.11	803.49	1088.8	1891.5	7271.6	20767.*
450	8	14.09	16.11	24.77	35.36	53.09	77.50	151.60	204.91	354.82	1359.1	3877.5*
	10	16.76	20.26	41.74	66.82	101.97	149.56	294.13	398.16	690.79	2651.8	7570.1*
	14	22.93	34.03	111.27	180.35	276.66	407.11	803.49	1088.8	1891.5	7271.6	20767.*
500	8	14.83	16.89	25.45	35.58	53.10	77.50	151.60	204.91	354.82	1359.1	3877.5*
	10	17.62	21.16	41.87	66.82	101.97	149.56	294.13	398.16	690.79	2651.8	7570.1*
	14	24.01	34.75	111.27	180.35	276.66	407.11	803.49	1088.8	1891.5	7271.6	20767.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.0 m (RADIUS = 6.4 m)³
FIRE GROWTH: SLOW (ALPHA = $.00293 \text{ kJ/s}^3$)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	15.54	17.64	26.14	35.87	53.11	77.50	151.60	204.91	354.82	1359.1	3877.5*
	10	18.45	22.02	42.06	66.82	101.97	149.56	294.13	398.16	690.79	2651.8	7570.1*
	14	25.04	35.52	111.27	180.35	276.66	407.11	803.49	1088.8	1891.5	7271.6	20767.*
600	8	16.22	18.37	26.83	36.21	53.13	77.50	151.60	204.91	354.82	1359.1	3877.5*
	10	19.25	22.85	42.31	66.82	101.97	149.56	294.13	398.16	690.79	2651.8	7570.1*
	14	26.04	36.30	111.27	180.35	276.66	407.11	803.49	1088.8	1891.5	7271.6	20767.*
650	8	16.88	19.07	27.51	36.60	53.17	77.50	151.60	204.91	354.82	1359.1	3877.5*
	10	20.02	23.65	42.62	66.83	101.97	149.56	294.13	398.16	690.79	2651.8	7570.1*
	14	27.01	37.10	111.27	180.35	276.66	407.11	803.49	1088.8	1891.5	7271.6	20767.*
700	8	17.52	19.75	28.19	37.03	53.23	77.50	151.60	204.91	354.82	1359.1	3877.5*
	10	20.77	24.44	42.97	66.84	101.97	149.56	294.13	398.16	690.79	2651.8	7570.1*
	14	27.94	37.90	111.27	180.35	276.66	407.11	803.49	1088.8	1891.5	7271.6	20767.*
750	8	18.14	20.40	28.86	37.49	53.31	77.50	151.60	204.91	354.82	1359.1	3877.5*
	10	21.49	25.20	43.37	66.86	101.97	149.56	294.13	398.16	690.79	2651.8	7570.1*
	14	28.85	38.70	111.27	180.35	276.66	407.11	803.49	1088.8	1891.5	7271.6	20767.*
800	8	18.74	21.04	29.52	37.97	53.42	77.50	151.60	204.91	354.82	1359.1	3877.5*
	10	22.19	25.94	43.80	66.89	101.97	149.56	294.13	398.16	690.79	2651.8	7570.1*
	14	29.74	39.51	111.27	180.35	276.66	407.11	803.49	1088.8	1891.5	7271.6	20767.*
850	8	19.33	21.66	30.18	38.47	53.55	77.51	151.60	204.91	354.82	1359.1	3877.5*
	10	22.88	26.66	44.26	66.94	101.97	149.56	294.13	398.16	690.79	2651.8	7570.1*
	14	30.60	40.30	111.27	180.35	276.66	407.11	803.49	1088.8	1891.5	7271.6	20767.*
900	8	19.90	22.27	30.82	38.99	53.72	77.51	151.60	204.91	354.82	1359.1	3877.5*
	10	23.54	27.36	44.74	67.00	101.97	149.56	294.13	398.16	690.79	2651.8	7570.1*
	14	31.44	41.09	111.27	180.35	276.66	407.11	803.49	1088.8	1891.5	7271.6	20767.*
950	8	20.46	22.86	31.45	39.51	53.91	77.52	151.60	204.91	354.82	1359.1	3877.5*
	10	24.20	28.05	45.25	67.07	101.97	149.56	294.13	398.16	690.79	2651.8	7570.1*
	14	32.26	41.87	111.27	180.35	276.66	407.11	803.49	1088.8	1891.5	7271.6	20767.*
1000	8	21.01	23.44	32.07	40.04	54.13	77.54	151.60	204.91	354.82	1359.1	3877.5*
	10	24.83	28.72	45.76	67.17	101.97	149.56	294.13	398.16	690.79	2651.8	7570.1*
	14	33.07	42.65	111.27	180.35	276.66	407.11	803.49	1088.8	1891.5	7271.6	20767.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.5 m (RADIUS = 6.7 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	1.07	1.07	1.16	1.22	1.29	1.35	1.49	1.56	1.70	2.19	2.86*
	10	1.13	1.13	1.23	1.30	1.37	1.44	1.59	1.67	1.84	2.46	3.56*
	14	1.23	1.24	1.37	1.44	1.53	1.62	1.81	1.92	2.16	3.33	6.90*
100	8	1.26	1.27	1.38	1.45	1.52	1.60	1.76	1.84	2.02	2.59	3.32*
	10	1.34	1.35	1.48	1.56	1.64	1.73	1.91	2.01	2.21	2.92	3.99*
	14	1.50	1.52	1.67	1.77	1.87	1.98	2.21	2.34	2.62	3.79	6.91*
150	8	1.41	1.42	1.55	1.63	1.71	1.80	1.98	2.07	2.27	2.91	3.71*
	10	1.52	1.53	1.68	1.76	1.86	1.96	2.17	2.27	2.50	3.29	4.40*
	14	1.71	1.74	1.92	2.03	2.14	2.27	2.53	2.68	2.98	4.22	7.02*
200	8	1.54	1.56	1.70	1.78	1.88	1.97	2.17	2.27	2.49	3.18	4.04*
	10	1.67	1.69	1.85	1.95	2.05	2.16	2.39	2.50	2.75	3.61	4.78*
	14	1.90	1.93	2.13	2.25	2.38	2.52	2.81	2.97	3.30	4.61	7.24*
250	8	1.66	1.68	1.83	1.92	2.02	2.13	2.34	2.45	2.68	3.43	4.34*
	10	1.81	1.83	2.00	2.11	2.22	2.34	2.58	2.71	2.98	3.89	5.12*
	14	2.07	2.11	2.32	2.45	2.60	2.74	3.06	3.23	3.59	4.97	7.53*
300	8	1.77	1.79	1.95	2.05	2.16	2.27	2.50	2.62	2.86	3.66	4.62*
	10	1.93	1.96	2.15	2.26	2.38	2.50	2.77	2.90	3.19	4.16	5.44*
	14	2.23	2.27	2.50	2.64	2.79	2.95	3.29	3.47	3.85	5.30	7.84*
350	8	1.88	1.90	2.07	2.18	2.29	2.40	2.65	2.77	3.03	3.87	4.88*
	10	2.05	2.08	2.28	2.40	2.53	2.66	2.94	3.08	3.38	4.41	5.74*
	14	2.37	2.42	2.66	2.82	2.98	3.14	3.50	3.69	4.10	5.61	8.15*
400	8	1.97	2.00	2.18	2.29	2.41	2.53	2.78	2.92	3.19	4.07	5.12*
	10	2.16	2.20	2.40	2.53	2.67	2.80	3.10	3.25	3.57	4.64	6.02*
	14	2.51	2.56	2.82	2.98	3.15	3.33	3.70	3.90	4.33	5.90	8.46*
450	8	2.07	2.09	2.28	2.40	2.52	2.65	2.92	3.05	3.34	4.26	5.35*
	10	2.27	2.30	2.52	2.66	2.80	2.94	3.25	3.41	3.74	4.86	6.29*
	14	2.64	2.69	2.97	3.13	3.31	3.50	3.89	4.10	4.55	6.18	8.76*
500	8	2.16	2.18	2.38	2.50	2.63	2.77	3.04	3.19	3.48	4.44	5.57*
	10	2.37	2.41	2.64	2.78	2.92	3.08	3.40	3.56	3.91	5.07	6.54*
	14	2.76	2.82	3.11	3.28	3.47	3.66	4.08	4.29	4.76	6.44	9.06*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.5 m (RADIUS = 6.7 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE
TIME INDEX
OF RISE

CEILING HEIGHT, m

(m*s)^{1/2}

°C/min

1

2

4

5

6

7

9

10

12

18

24

550	8	2.24	2.27	2.48	2.60	2.74	2.88	3.16	3.31	3.62	4.61	5.78*
	10	2.47	2.51	2.75	2.89	3.04	3.20	3.54	3.71	4.07	5.27	6.79*
	14	2.88	2.94	3.25	3.43	3.62	3.82	4.25	4.48	4.96	6.69	9.35*
600	8	2.32	2.35	2.57	2.70	2.84	2.98	3.28	3.43	3.75	4.77	5.99*
	10	2.56	2.61	2.85	3.00	3.16	3.33	3.67	3.85	4.22	5.46	7.03*
	14	3.00	3.06	3.38	3.56	3.76	3.97	4.42	4.65	5.15	6.94	9.63*
650	8	2.40	2.44	2.66	2.79	2.94	3.08	3.39	3.55	3.88	4.93	6.18*
	10	2.65	2.70	2.95	3.11	3.27	3.44	3.80	3.98	4.37	5.65	7.25*
	14	3.11	3.18	3.50	3.70	3.90	4.12	4.58	4.82	5.34	7.17	9.91*
700	8	2.48	2.51	2.74	2.88	3.03	3.18	3.50	3.66	4.00	5.09	6.37*
	10	2.74	2.79	3.05	3.21	3.38	3.56	3.93	4.12	4.51	5.83	7.48*
	14	3.22	3.29	3.62	3.83	4.04	4.26	4.74	4.99	5.52	7.40	10.18*
750	8	2.55	2.59	2.83	2.97	3.12	3.28	3.61	3.77	4.12	5.24	6.56*
	10	2.83	2.88	3.15	3.31	3.49	3.67	4.05	4.24	4.65	6.00	7.69*
	14	3.33	3.40	3.74	3.95	4.17	4.40	4.89	5.15	5.69	7.62	10.44*
800	8	2.63	2.66	2.91	3.06	3.21	3.37	3.71	3.88	4.24	5.39	6.73*
	10	2.91	2.96	3.24	3.41	3.59	3.78	4.17	4.37	4.79	6.18	7.90*
	14	3.43	3.50	3.86	4.07	4.30	4.54	5.04	5.30	5.86	7.84	10.69*
850	8	2.70	2.74	2.99	3.14	3.30	3.46	3.81	3.99	4.35	5.53	6.91*
	10	2.99	3.04	3.33	3.51	3.69	3.88	4.28	4.49	4.92	6.34	8.10*
	14	3.53	3.60	3.97	4.19	4.42	4.67	5.18	5.45	6.03	8.05	10.94*
900	8	2.77	2.81	3.07	3.22	3.38	3.55	3.91	4.09	4.46	5.67	7.08*
	10	3.07	3.13	3.42	3.60	3.79	3.99	4.39	4.61	5.05	6.50	8.30*
	14	3.63	3.70	4.08	4.31	4.55	4.80	5.32	5.60	6.19	8.25	11.19*
950	8	2.83	2.88	3.14	3.30	3.47	3.64	4.00	4.19	4.57	5.80	7.24*
	10	3.15	3.20	3.51	3.69	3.89	4.09	4.51	4.72	5.17	6.66	8.49*
	14	3.72	3.80	4.19	4.42	4.66	4.92	5.46	5.75	6.35	8.45	11.43*
1000	8	2.90	2.94	3.21	3.38	3.55	3.73	4.10	4.29	4.68	5.94	7.41*
	10	3.23	3.28	3.59	3.78	3.98	4.18	4.61	4.84	5.30	6.82	8.68*
	14	3.81	3.90	4.29	4.53	4.78	5.04	5.60	5.89	6.50	8.65	11.66*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.5 m (RADIUS = 6.7 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE
 TIME INDEX

CEILING HEIGHT, m

RATE
 OF RISE

(m*s)^{1/2}

°C/min

	1	2	4	5	6	7	9	10	12	18	24
50	1.70 1.82 2.06	1.72 1.86 2.14	1.91 2.10 2.49	2.03 2.25 2.73	2.17 2.42 3.03	2.31 2.61 3.42	2.65 3.10 4.81	2.85 3.43 6.02	3.35 4.45 9.54	7.41 12.89 32.46	18.14* 33.57* 88.72*
100	2.08 2.27 2.61	2.12 2.32 2.72	2.36 2.62 3.14	2.51 2.80 3.42	2.67 3.00 3.75	2.84 3.23 4.15	3.24 3.77 5.32	3.46 4.10 6.27	3.98 4.98 9.55	7.46 12.89 32.46	18.14* 33.57* 88.72*
150	2.39 2.62 3.06	2.44 2.70 3.18	2.72 3.03 3.67	2.89 3.24 3.98	3.07 3.47 4.34	3.27 3.72 4.77	3.71 4.31 5.92	3.95 4.66 6.76	4.52 5.54 9.64	7.70 12.89 32.46	18.14* 33.57* 88.72*
200	2.66 2.94 3.45	2.72 3.02 3.59	3.03 3.39 4.12	3.21 3.62 4.46	3.42 3.88 4.85	3.63 4.15 5.30	4.11 4.78 6.47	4.38 5.16 7.28	4.98 6.06 9.87	8.07 12.91 32.46	18.14* 33.57* 88.72*
250	2.91 3.22 3.79	2.97 3.31 3.95	3.31 3.72 4.53	3.51 3.97 4.90	3.73 4.24 5.31	3.96 4.54 5.79	4.48 5.21 6.99	4.76 5.60 7.79	5.40 6.54 10.21	8.47 13.00 32.46	18.14* 33.57* 88.72*
300	3.13 3.48 4.12	3.21 3.58 4.28	3.56 4.01 4.91	3.78 4.28 5.29	4.02 4.57 5.73	4.27 4.89 6.23	4.82 5.60 7.47	5.12 6.01 8.28	5.79 6.98 10.60	8.88 13.15 32.46	18.15* 33.57* 88.72*
350	3.34 3.72 4.41	3.42 3.83 4.59	3.80 4.29 5.25	4.04 4.58 5.67	4.28 4.89 6.13	4.55 5.22 6.65	5.13 5.97 7.92	5.45 6.40 8.74	6.15 7.39 11.01	9.29 13.37 32.46	18.18* 33.57* 88.72*
400	3.54 3.95 4.70	3.63 4.06 4.89	4.03 4.55 5.58	4.27 4.85 6.01	4.54 5.18 6.50	4.82 5.53 7.04	5.42 6.31 8.35	5.76 6.76 9.18	6.49 7.79 11.42	9.68 13.64 32.46	18.24* 33.57* 88.72*
450	3.73 4.16 4.96	3.82 4.29 5.16	4.24 4.80 5.89	4.50 5.12 6.35	4.78 5.46 6.85	5.07 5.82 7.41	5.70 6.64 8.76	6.05 7.10 9.60	6.81 8.16 11.83	10.06 13.93 32.47	18.33* 33.57* 88.72*
500	3.91 4.37 5.22	4.00 4.50 5.43	4.45 5.04 6.19	4.72 5.37 6.66	5.00 5.72 7.18	5.31 6.10 7.76	5.97 6.95 9.15	6.33 7.43 10.00	7.12 8.52 12.24	10.43 14.24 32.47	18.46* 33.57* 88.72*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.5 m (RADIUS = 6.7 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550 (m*s) ^{1/2}	8	4.08	4.18	4.65	4.92	5.22	5.54	6.23	6.60	7.41	10.78	18.62*	
	10	4.57	4.70	5.27	5.61	5.98	6.37	7.25	7.74	8.86	14.57	33.57*	
	14	5.47	5.68	6.48	6.96	7.50	8.10	9.52	10.39	12.63	32.47	88.72*	
600	8	4.25	4.35	4.83	5.12	5.43	5.76	6.47	6.86	7.70	11.13	18.81*	
	10	4.76	4.90	5.49	5.84	6.22	6.63	7.54	8.04	9.19	14.90	33.57*	
	14	5.70	5.93	6.75	7.25	7.81	8.43	9.88	10.76	13.02	32.48	88.72*	
650	8	4.41	4.52	5.02	5.32	5.64	5.98	6.71	7.11	7.97	11.47	19.02*	
	10	4.94	5.09	5.70	6.06	6.46	6.88	7.81	8.33	9.51	15.23	33.58*	
	14	5.93	6.17	7.02	7.54	8.11	8.74	10.23	11.13	13.39	32.49	88.72*	
700	8	4.56	4.68	5.19	5.50	5.83	6.18	6.94	7.35	8.23	11.79	19.25*	
	10	5.12	5.28	5.90	6.28	6.69	7.12	8.08	8.61	9.81	15.55	33.59*	
	14	6.15	6.40	7.27	7.81	8.40	9.05	10.57	11.48	13.76	32.50	88.72*	
750	8	4.71	4.84	5.37	5.69	6.03	6.39	7.16	7.58	8.49	12.11	19.49*	
	10	5.30	5.46	6.10	6.49	6.91	7.36	8.34	8.89	10.11	15.88	33.60*	
	14	6.37	6.62	7.52	8.07	8.68	9.34	10.90	11.82	14.12	32.53	88.72*	
800	8	4.86	4.99	5.53	5.86	6.21	6.58	7.38	7.81	8.74	12.42	19.74*	
	10	5.47	5.63	6.30	6.70	7.13	7.58	8.60	9.15	10.40	16.21	33.62*	
	14	6.58	6.84	7.77	8.33	8.95	9.63	11.22	12.15	14.48	32.57	88.72*	
850	8	5.01	5.13	5.70	6.03	6.39	6.77	7.59	8.03	8.98	12.73	20.00*	
	10	5.63	5.80	6.49	6.89	7.34	7.81	8.84	9.41	10.69	16.53	33.65*	
	14	6.78	7.05	8.00	8.58	9.21	9.91	11.53	12.48	14.82	32.62	88.72*	
900	8	5.15	5.28	5.86	6.20	6.57	6.96	7.80	8.25	9.22	13.02	20.27*	
	10	5.79	5.97	6.67	7.09	7.54	8.02	9.08	9.66	10.96	16.85	33.69*	
	14	6.98	7.25	8.23	8.82	9.47	10.18	11.83	12.80	15.16	32.68	88.72*	
950	8	5.28	5.42	6.01	6.37	6.74	7.14	8.00	8.46	9.45	13.31	20.54*	
	10	5.95	6.13	6.85	7.28	7.74	8.24	9.32	9.91	11.23	17.16	33.74*	
	14	7.18	7.46	8.46	9.06	9.73	10.45	12.13	13.11	15.49	32.75	88.72*	
1000	8	5.42	5.56	6.16	6.53	6.91	7.32	8.20	8.67	9.68	13.60	20.81*	
	10	6.10	6.29	7.03	7.47	7.94	8.44	9.55	10.15	11.50	17.47	33.80*	
	14	7.37	7.65	8.68	9.29	9.97	10.71	12.42	13.41	15.82	32.84	88.72*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.5 m (RADIUS = 6.7 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	2.91	3.08	3.80	4.39	5.33	6.89	12.12	15.85	26.22	94.16	261.61*
	10	3.24	3.52	4.78	6.18	8.60	12.00	22.15	29.37	49.49	181.81	508.51*
	14	3.93	4.61	9.31	14.29	21.15	30.36	57.98	77.68	132.66	495.07	1390.9*
100	8	3.72	3.94	4.75	5.35	6.16	7.36	12.13	15.85	26.22	94.16	261.61*
	10	4.18	4.51	5.80	6.93	8.84	12.01	22.15	29.37	49.49	181.81	508.51*
	14	5.12	5.83	9.58	14.29	21.15	30.36	57.98	77.68	132.66	495.07	1390.9*
150	8	4.37	4.62	5.52	6.15	6.96	8.07	12.23	15.86	26.22	94.16	261.61*
	10	4.94	5.31	6.67	7.76	9.42	12.17	22.15	29.37	49.49	181.81	508.51*
	14	6.07	6.83	10.24	14.39	21.15	30.36	57.98	77.68	132.66	495.07	1390.9*
200	8	4.93	5.21	6.19	6.85	7.69	8.77	12.53	15.92	26.22	94.16	261.61*
	10	5.59	6.00	7.44	8.53	10.09	12.55	22.15	29.37	49.49	181.81	508.51*
	14	6.89	7.70	11.00	14.68	21.17	30.36	57.98	77.68	132.66	495.07	1390.9*
250	8	5.44	5.74	6.79	7.49	8.35	9.43	12.96	16.08	26.22	94.16	261.61*
	10	6.18	6.61	8.14	9.25	10.77	13.05	22.17	29.37	49.49	181.81	508.51*
	14	7.63	8.48	11.76	15.13	21.22	30.36	57.98	77.68	132.66	495.07	1390.9*
300	8	5.91	6.22	7.34	8.07	8.96	10.05	13.45	16.35	26.22	94.16	261.61*
	10	6.72	7.18	8.78	9.92	11.43	13.60	22.22	29.37	49.49	181.81	508.51*
	14	8.31	9.19	12.50	15.68	21.36	30.36	57.98	77.68	132.66	495.07	1390.9*
350	8	6.34	6.68	7.85	8.62	9.53	10.64	13.97	16.69	26.24	94.16	261.61*
	10	7.22	7.71	9.37	10.54	12.06	14.17	22.32	29.38	49.49	181.81	508.51*
	14	8.94	9.86	13.21	16.27	21.59	30.38	57.98	77.68	132.66	495.07	1390.9*
400	8	6.75	7.11	8.34	9.13	10.07	11.21	14.49	17.10	26.28	94.16	261.61*
	10	7.69	8.21	9.94	11.13	12.66	14.74	22.49	29.40	49.49	181.81	508.51*
	14	9.53	10.49	13.89	16.87	21.90	30.41	57.98	77.68	132.66	495.07	1390.9*
450	8	7.14	7.51	8.79	9.62	10.59	11.74	15.01	17.53	26.35	94.16	261.61*
	10	8.14	8.68	10.47	11.70	13.24	15.30	22.73	29.45	49.49	181.81	508.51*
	14	10.10	11.08	14.54	17.47	22.28	30.48	57.98	77.68	132.66	495.07	1390.9*
500	8	7.51	7.90	9.23	10.08	11.08	12.25	15.52	17.98	26.47	94.16	261.61*
	10	8.57	9.13	10.98	12.23	13.80	15.85	23.02	29.52	49.49	181.81	508.51*
	14	10.64	11.65	15.16	18.07	22.70	30.59	57.98	77.68	132.66	495.07	1390.9*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.5 m (RADIUS = 6.7 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	7.87	8.27	9.65	10.53	11.55	12.75	16.03	18.43	26.62	94.16	261.61*	
	10	8.99	9.56	11.47	12.75	14.34	16.39	23.34	29.63	49.49	181.81	508.51*	
	14	11.15	12.20	15.76	18.65	23.15	30.74	57.98	77.68	132.66	495.07	1390.9*	
600	8	8.21	8.63	10.05	10.96	12.00	13.22	16.52	18.89	26.81	94.16	261.61*	
	10	9.38	9.98	11.94	13.25	14.86	16.91	23.70	29.78	49.49	181.81	508.51*	
	14	11.65	12.72	16.35	19.23	23.62	30.94	57.98	77.68	132.66	495.07	1390.9*	
650	8	8.54	8.97	10.44	11.37	12.44	13.68	17.00	19.35	27.04	94.16	261.61*	
	10	9.77	10.38	12.39	13.73	15.36	17.42	24.08	29.96	49.49	181.81	508.51*	
	14	12.13	13.23	16.91	19.79	24.10	31.17	57.99	77.68	132.66	495.07	1390.9*	
700	8	8.86	9.31	10.82	11.77	12.86	14.13	17.47	19.80	27.30	94.16	261.61*	
	10	10.14	10.77	12.83	14.20	15.85	17.92	24.48	30.18	49.50	181.81	508.51*	
	14	12.60	13.72	17.46	20.34	24.58	31.44	57.99	77.68	132.66	495.07	1390.9*	
750	8	9.17	9.63	11.18	12.16	13.27	14.56	17.93	20.25	27.58	94.16	261.61*	
	10	10.50	11.15	13.26	14.65	16.32	18.41	24.88	30.43	49.51	181.81	508.51*	
	14	13.05	14.19	17.99	20.88	25.07	31.75	57.99	77.68	132.66	495.07	1390.9*	
800	8	9.48	9.95	11.54	12.53	13.67	14.98	18.38	20.69	27.88	94.16	261.61*	
	10	10.85	11.51	13.68	15.09	16.79	18.88	25.30	30.70	49.52	181.81	508.51*	
	14	13.48	14.65	18.51	21.41	25.56	32.07	57.99	77.69	132.66	495.07	1390.9*	
850	8	9.77	10.26	11.89	12.90	14.06	15.39	18.82	21.13	28.20	94.16	261.61*	
	10	11.19	11.87	14.08	15.52	17.24	19.35	25.71	30.99	49.54	181.81	508.51*	
	14	13.91	15.10	19.01	21.93	26.05	32.42	58.00	77.69	132.66	495.07	1390.9*	
900	8	10.06	10.56	12.22	13.26	14.44	15.80	19.25	21.56	28.53	94.16	261.61*	
	10	11.52	12.22	14.47	15.93	17.68	19.81	26.13	31.30	49.56	181.81	508.51*	
	14	14.33	15.54	19.51	22.44	26.53	32.78	58.01	77.69	132.66	495.07	1390.9*	
950	8	10.34	10.85	12.55	13.61	14.81	16.19	19.67	21.99	28.87	94.16	261.61*	
	10	11.85	12.56	14.86	16.34	18.11	20.25	26.55	31.63	49.59	181.81	508.51*	
	14	14.74	15.97	19.99	22.94	27.02	33.16	58.03	77.69	132.66	495.07	1390.9*	
1000	8	10.62	11.14	12.87	13.95	15.18	16.57	20.09	22.41	29.22	94.16	261.61*	
	10	12.17	12.89	15.23	16.74	18.53	20.69	26.97	31.96	49.64	181.81	508.51*	
	14	15.13	16.39	20.46	23.43	27.49	33.54	58.05	77.69	132.66	495.07	1390.9*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.5 m (RADIUS = 6.7 m)
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50 (m*s) ^{1/2}	8	6.07	8.66	25.65	40.42	60.81	88.18	170.44	229.15	393.06	1474.4	4148.1*
	10	7.70	14.88	48.49	77.27	117.00	170.39	330.88	445.46	765.44	2876.8	8098.4*
	14	14.94	38.08	130.11	208.94	317.83	464.17	904.26	1218.5	2096.2	7889.0	22216.*
100	8	7.80	9.94	25.65	40.42	60.81	88.18	170.44	229.15	393.06	1474.4	4148.1*
	10	9.59	15.11	48.49	77.27	117.00	170.39	330.88	445.46	765.44	2876.8	8098.4*
	14	15.68	38.08	130.11	208.94	317.83	464.17	904.26	1218.5	2096.2	7889.0	22216.*
150	8	9.19	11.26	25.66	40.42	60.81	88.18	170.44	229.15	393.06	1474.4	4148.1*
	10	11.19	15.91	48.49	77.27	117.00	170.39	330.88	445.46	765.44	2876.8	8098.4*
	14	17.07	38.08	130.11	208.94	317.83	464.17	904.26	1218.5	2096.2	7889.0	22216.*
200	8	10.40	12.47	25.70	40.43	60.81	88.18	170.44	229.15	393.06	1474.4	4148.1*
	10	12.58	16.95	48.49	77.27	117.00	170.39	330.88	445.46	765.44	2876.8	8098.4*
	14	18.55	38.08	130.11	208.94	317.83	464.17	904.26	1218.5	2096.2	7889.0	22216.*
250	8	11.49	13.59	25.84	40.43	60.81	88.18	170.44	229.15	393.06	1474.4	4148.1*
	10	13.85	18.04	48.49	77.27	117.00	170.39	330.88	445.46	765.44	2876.8	8098.4*
	14	19.99	38.12	130.11	208.94	317.83	464.17	904.26	1218.5	2096.2	7889.0	22216.*
300	8	12.49	14.62	26.13	40.43	60.81	88.18	170.44	229.15	393.06	1474.4	4148.1*
	10	15.01	19.12	48.49	77.27	117.00	170.39	330.88	445.46	765.44	2876.8	8098.4*
	14	21.36	38.24	130.11	208.94	317.83	464.17	904.26	1218.5	2096.2	7889.0	22216.*
350	8	13.41	15.59	26.54	40.44	60.81	88.18	170.44	229.15	393.06	1474.4	4148.1*
	10	16.09	20.16	48.50	77.27	117.00	170.39	330.88	445.46	765.44	2876.8	8098.4*
	14	22.66	38.48	130.11	208.94	317.83	464.17	904.26	1218.5	2096.2	7889.0	22216.*
400	8	14.29	16.50	27.06	40.48	60.81	88.18	170.44	229.15	393.06	1474.4	4148.1*
	10	17.11	21.17	48.51	77.27	117.00	170.39	330.88	445.46	765.44	2876.8	8098.4*
	14	23.91	38.84	130.11	208.94	317.83	464.17	904.26	1218.5	2096.2	7889.0	22216.*
450	8	15.12	17.37	27.65	40.56	60.81	88.18	170.44	229.15	393.06	1474.4	4148.1*
	10	18.07	22.14	48.54	77.27	117.00	170.39	330.88	445.46	765.44	2876.8	8098.4*
	14	25.09	39.32	130.11	208.94	317.83	464.17	904.26	1218.5	2096.2	7889.0	22216.*
500	8	15.91	18.21	28.28	40.68	60.81	88.18	170.44	229.15	393.06	1474.4	4148.1*
	10	19.00	23.07	48.59	77.27	117.00	170.39	330.88	445.46	765.44	2876.8	8098.4*
	14	26.23	39.89	130.11	208.94	317.83	464.17	904.26	1218.5	2096.2	7889.0	22216.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 9.5 m (RADIUS = 6.7 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	16.67	19.00	28.93	40.86	60.82	88.18	170.44	229.15	393.06	1474.4	4148.1*
	10	19.88	23.98	48.69	77.27	117.00	170.39	330.88	445.46	765.44	2876.8	8098.4*
	14	27.33	40.53	130.11	208.94	317.83	464.17	904.26	1218.5	2096.2	7889.0	22216.*
600	8	17.39	19.77	29.60	41.09	60.82	88.18	170.44	229.15	393.06	1474.4	4148.1*
	10	20.73	24.85	48.82	77.27	117.00	170.39	330.88	445.46	765.44	2876.8	8098.4*
	14	28.39	41.23	130.11	208.94	317.83	464.17	904.26	1218.5	2096.2	7889.0	22216.*
650	8	18.10	20.52	30.27	41.37	60.84	88.18	170.44	229.15	393.06	1474.4	4148.1*
	10	21.55	25.70	49.01	77.27	117.00	170.39	330.88	445.46	765.44	2876.8	8098.4*
	14	29.42	41.95	130.11	208.94	317.83	464.17	904.26	1218.5	2096.2	7889.0	22216.*
700	8	18.78	21.23	30.94	41.70	60.86	88.19	170.44	229.15	393.06	1474.4	4148.1*
	10	22.35	26.53	49.24	77.27	117.00	170.39	330.88	445.46	765.44	2876.8	8098.4*
	14	30.41	42.71	130.11	208.94	317.83	464.17	904.26	1218.5	2096.2	7889.0	22216.*
750	8	19.44	21.93	31.62	42.08	60.90	88.19	170.44	229.15	393.06	1474.4	4148.1*
	10	23.12	27.33	49.52	77.28	117.00	170.39	330.88	445.46	765.44	2876.8	8098.4*
	14	31.38	43.47	130.11	208.94	317.83	464.17	904.26	1218.5	2096.2	7889.0	22216.*
800	8	20.08	22.61	32.28	42.48	60.95	88.19	170.44	229.15	393.06	1474.4	4148.1*
	10	23.87	28.11	49.84	77.29	117.00	170.39	330.88	445.46	765.44	2876.8	8098.4*
	14	32.32	44.25	130.11	208.94	317.83	464.17	904.26	1218.5	2096.2	7889.0	22216.*
850	8	20.71	23.27	32.95	42.92	61.02	88.19	170.44	229.15	393.06	1474.4	4148.1*
	10	24.60	28.87	50.20	77.30	117.00	170.39	330.88	445.46	765.44	2876.8	8098.4*
	14	33.24	45.03	130.11	208.94	317.83	464.17	904.26	1218.5	2096.2	7889.0	22216.*
900	8	21.32	23.92	33.60	43.38	61.11	88.19	170.44	229.15	393.06	1474.4	4148.1*
	10	25.31	29.62	50.59	77.33	117.00	170.39	330.88	445.46	765.44	2876.8	8098.4*
	14	34.13	45.81	130.11	208.94	317.83	464.17	904.26	1218.5	2096.2	7889.0	22216.*
950	8	21.92	24.55	34.25	43.85	61.22	88.19	170.44	229.15	393.06	1474.4	4148.1*
	10	26.01	30.35	51.01	77.36	117.00	170.39	330.88	445.46	765.44	2876.8	8098.4*
	14	35.01	46.59	130.11	208.94	317.83	464.17	904.26	1218.5	2096.2	7889.0	22216.*
1000	8	22.50	25.16	34.89	44.34	61.36	88.20	170.44	229.15	393.06	1474.4	4148.1*
	10	26.69	31.06	51.45	77.40	117.00	170.39	330.88	445.46	765.44	2876.8	8098.4*
	14	35.86	47.37	130.11	208.94	317.83	464.17	904.26	1218.5	2096.2	7889.0	22216.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 m (RADIUS = 7.1 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	1.13	1.12	1.21	1.27	1.33	1.40	1.53	1.60	1.75	2.25	2.92*	
	10	1.19	1.18	1.28	1.35	1.42	1.49	1.64	1.73	1.90	2.53	3.69*	
	14	1.30	1.30	1.42	1.50	1.59	1.68	1.88	1.99	2.23	3.48	7.29*	
100	8	1.33	1.33	1.43	1.50	1.58	1.65	1.82	1.90	2.08	2.66	3.39*	
	10	1.41	1.42	1.54	1.62	1.70	1.79	1.98	2.07	2.28	3.00	4.10*	
	14	1.58	1.59	1.75	1.84	1.95	2.06	2.29	2.42	2.71	3.94	7.29*	
150	8	1.49	1.49	1.61	1.69	1.78	1.86	2.05	2.14	2.34	2.99	3.78*	
	10	1.60	1.61	1.75	1.84	1.93	2.03	2.24	2.35	2.58	3.38	4.52*	
	14	1.81	1.83	2.00	2.11	2.23	2.36	2.63	2.77	3.09	4.38	7.38*	
200	8	1.63	1.63	1.77	1.86	1.95	2.04	2.24	2.35	2.56	3.27	4.12*	
	10	1.76	1.77	1.93	2.03	2.13	2.24	2.47	2.59	2.84	3.71	4.90*	
	14	2.01	2.03	2.23	2.35	2.48	2.62	2.92	3.08	3.42	4.78	7.57*	
250	8	1.75	1.76	1.91	2.00	2.10	2.21	2.42	2.53	2.76	3.52	4.43*	
	10	1.91	1.92	2.09	2.20	2.31	2.43	2.68	2.81	3.08	4.01	5.24*	
	14	2.19	2.22	2.43	2.56	2.71	2.86	3.18	3.35	3.72	5.15	7.84*	
300	8	1.87	1.88	2.04	2.14	2.25	2.36	2.59	2.71	2.95	3.76	4.71*	
	10	2.04	2.06	2.24	2.36	2.48	2.60	2.87	3.01	3.30	4.28	5.57*	
	14	2.35	2.39	2.62	2.76	2.91	3.07	3.42	3.60	3.99	5.49	8.13*	
350	8	1.98	1.99	2.16	2.27	2.38	2.50	2.74	2.87	3.13	3.98	4.98*	
	10	2.17	2.19	2.38	2.50	2.63	2.76	3.04	3.19	3.50	4.54	5.87*	
	14	2.50	2.54	2.79	2.94	3.10	3.27	3.64	3.83	4.25	5.80	8.44*	
400	8	2.08	2.10	2.28	2.39	2.51	2.63	2.88	3.02	3.29	4.18	5.22*	
	10	2.28	2.31	2.51	2.64	2.78	2.92	3.21	3.37	3.69	4.78	6.16*	
	14	2.65	2.69	2.95	3.11	3.28	3.46	3.85	4.05	4.49	6.10	8.75*	
450	8	2.18	2.20	2.39	2.50	2.63	2.75	3.02	3.16	3.44	4.38	5.46*	
	10	2.40	2.42	2.64	2.77	2.91	3.06	3.37	3.53	3.87	5.00	6.43*	
	14	2.79	2.84	3.11	3.28	3.46	3.64	4.05	4.26	4.71	6.39	9.05*	
500	8	2.27	2.30	2.49	2.61	2.74	2.87	3.15	3.30	3.59	4.56	5.68*	
	10	2.50	2.53	2.76	2.90	3.05	3.20	3.52	3.69	4.04	5.22	6.69*	
	14	2.92	2.97	3.26	3.43	3.62	3.82	4.24	4.46	4.93	6.66	9.35*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 m (RADIUS = 7.1 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	2.36	2.39	2.59	2.72	2.85	2.99	3.28	3.43	3.74	4.74	5.90*
	10	2.61	2.64	2.87	3.02	3.17	3.33	3.67	3.84	4.21	5.43	6.94*
	14	3.05	3.10	3.40	3.58	3.78	3.98	4.42	4.65	5.14	6.92	9.64*
600	8	2.45	2.48	2.69	2.82	2.96	3.10	3.40	3.55	3.87	4.91	6.11*
	10	2.71	2.74	2.99	3.13	3.29	3.46	3.81	3.99	4.36	5.63	7.18*
	14	3.17	3.23	3.54	3.73	3.93	4.14	4.59	4.83	5.34	7.17	9.92*
650	8	2.54	2.56	2.78	2.91	3.06	3.21	3.52	3.68	4.00	5.08	6.30*
	10	2.80	2.84	3.09	3.25	3.41	3.58	3.94	4.13	4.52	5.82	7.41*
	14	3.29	3.35	3.67	3.87	4.07	4.29	4.76	5.01	5.53	7.42	10.20*
700	8	2.62	2.64	2.87	3.01	3.16	3.31	3.63	3.79	4.13	5.24	6.50*
	10	2.90	2.93	3.20	3.36	3.53	3.70	4.07	4.27	4.67	6.01	7.64*
	14	3.40	3.47	3.80	4.00	4.22	4.44	4.92	5.18	5.72	7.65	10.47*
750	8	2.70	2.72	2.96	3.10	3.25	3.41	3.74	3.91	4.26	5.39	6.69*
	10	2.99	3.03	3.30	3.46	3.64	3.82	4.20	4.40	4.81	6.19	7.86*
	14	3.52	3.58	3.92	4.13	4.35	4.59	5.08	5.35	5.90	7.88	10.73*
800	8	2.77	2.80	3.04	3.19	3.35	3.51	3.85	4.02	4.38	5.54	6.87*
	10	3.08	3.12	3.39	3.56	3.74	3.93	4.32	4.53	4.95	6.36	8.07*
	14	3.62	3.69	4.04	4.26	4.49	4.73	5.24	5.51	6.08	8.10	10.99*
850	8	2.85	2.88	3.13	3.28	3.44	3.60	3.95	4.13	4.50	5.69	7.05*
	10	3.16	3.21	3.49	3.66	3.85	4.04	4.44	4.65	5.09	6.54	8.28*
	14	3.73	3.80	4.16	4.38	4.62	4.87	5.39	5.66	6.25	8.32	11.25*
900	8	2.92	2.95	3.21	3.36	3.53	3.70	4.05	4.23	4.61	5.83	7.22*
	10	3.25	3.29	3.58	3.76	3.95	4.15	4.56	4.78	5.22	6.70	8.48*
	14	3.83	3.90	4.28	4.50	4.75	5.00	5.54	5.82	6.41	8.53	11.49*
950	8	2.99	3.03	3.29	3.45	3.61	3.79	4.15	4.34	4.72	5.97	7.39*
	10	3.33	3.37	3.68	3.86	4.05	4.25	4.68	4.90	5.35	6.87	8.68*
	14	3.93	4.01	4.39	4.62	4.87	5.13	5.68	5.97	6.58	8.74	11.74*
1000	8	3.06	3.10	3.36	3.53	3.70	3.88	4.25	4.44	4.84	6.11	7.55*
	10	3.41	3.46	3.76	3.95	4.15	4.36	4.79	5.01	5.48	7.03	8.87*
	14	4.03	4.11	4.50	4.74	4.99	5.26	5.82	6.11	6.74	8.94	11.98*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 m (RADIUS = 7.1 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	1.79	1.81	2.00	2.12	2.26	2.41	2.76	2.96	3.50	7.91	19.27*
	10	1.92	1.96	2.19	2.35	2.53	2.73	3.25	3.61	4.76	13.84	35.76*
	14	2.18	2.25	2.62	2.88	3.20	3.64	5.24	6.59	10.43	35.05	94.69*
100	8	2.20	2.23	2.47	2.62	2.78	2.96	3.37	3.60	4.15	7.94	19.27*
	10	2.39	2.45	2.74	2.93	3.14	3.37	3.94	4.29	5.26	13.84	35.76*
	14	2.77	2.87	3.31	3.61	3.96	4.39	5.69	6.78	10.43	35.05	94.69*
150	8	2.53	2.57	2.84	3.02	3.20	3.41	3.86	4.11	4.70	8.14	19.27*
	10	2.77	2.84	3.18	3.39	3.63	3.89	4.51	4.88	5.82	13.84	35.76*
	14	3.24	3.36	3.86	4.19	4.57	5.02	6.28	7.23	10.49	35.05	94.69*
200	8	2.81	2.87	3.17	3.36	3.57	3.79	4.28	4.56	5.18	8.49	19.27*
	10	3.10	3.18	3.56	3.80	4.06	4.34	5.00	5.39	6.35	13.86	35.76*
	14	3.65	3.79	4.34	4.70	5.11	5.58	6.85	7.74	10.67	35.05	94.69*
250	8	3.07	3.13	3.46	3.67	3.90	4.13	4.66	4.96	5.62	8.88	19.27*
	10	3.40	3.49	3.90	4.16	4.44	4.74	5.45	5.85	6.84	13.92	35.76*
	14	4.02	4.17	4.77	5.15	5.59	6.09	7.38	8.26	10.97	35.05	94.69*
300	8	3.31	3.38	3.74	3.96	4.20	4.45	5.01	5.33	6.02	9.29	19.28*
	10	3.68	3.77	4.21	4.49	4.79	5.11	5.85	6.28	7.30	14.04	35.76*
	14	4.36	4.52	5.17	5.57	6.03	6.55	7.88	8.75	11.33	35.05	94.69*
350	8	3.53	3.60	3.99	4.22	4.48	4.75	5.34	5.67	6.39	9.70	19.30*
	10	3.93	4.04	4.51	4.80	5.11	5.46	6.23	6.68	7.73	14.23	35.76*
	14	4.68	4.85	5.53	5.96	6.44	6.99	8.34	9.22	11.73	35.05	94.69*
400	8	3.74	3.82	4.22	4.47	4.74	5.03	5.65	5.99	6.75	10.10	19.34*
	10	4.17	4.29	4.78	5.09	5.42	5.78	6.59	7.06	8.13	14.47	35.76*
	14	4.98	5.16	5.88	6.33	6.83	7.40	8.79	9.67	12.13	35.05	94.69*
450	8	3.94	4.03	4.45	4.71	4.99	5.29	5.94	6.30	7.08	10.49	19.40*
	10	4.40	4.52	5.04	5.36	5.71	6.09	6.93	7.41	8.52	14.74	35.76*
	14	5.26	5.46	6.21	6.67	7.20	7.78	9.21	10.11	12.54	35.05	94.69*
500	8	4.13	4.22	4.67	4.94	5.23	5.54	6.22	6.59	7.40	10.86	19.50*
	10	4.62	4.75	5.29	5.63	5.99	6.38	7.26	7.75	8.89	15.04	35.76*
	14	5.53	5.74	6.52	7.01	7.55	8.15	9.62	10.52	12.95	35.05	94.69*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 m (RADIUS = 7.1 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	4.31	4.41	4.87	5.16	5.46	5.78	6.48	6.87	7.71	11.23	19.63*
	10	4.83	4.96	5.53	5.88	6.26	6.66	7.57	8.08	9.24	15.36	35.76*
	14	5.79	6.01	6.82	7.32	7.88	8.51	10.01	10.93	13.35	35.05	94.69*
600	8	4.49	4.59	5.07	5.36	5.68	6.01	6.74	7.14	8.00	11.58	19.80*
	10	5.04	5.17	5.76	6.12	6.51	6.93	7.87	8.39	9.58	15.68	35.76*
	14	6.04	6.27	7.11	7.63	8.21	8.85	10.38	11.32	13.74	35.06	94.69*
650	8	4.66	4.76	5.26	5.57	5.89	6.24	6.99	7.39	8.28	11.93	19.98*
	10	5.23	5.37	5.99	6.36	6.76	7.19	8.16	8.69	9.91	16.00	35.77*
	14	6.29	6.52	7.39	7.93	8.52	9.18	10.74	11.69	14.13	35.06	94.69*
700	8	4.83	4.93	5.45	5.76	6.10	6.46	7.23	7.65	8.56	12.26	20.19*
	10	5.42	5.57	6.20	6.59	7.00	7.45	8.44	8.99	10.23	16.33	35.77*
	14	6.52	6.76	7.66	8.21	8.82	9.50	11.10	12.06	14.50	35.07	94.69*
750	8	4.99	5.10	5.63	5.95	6.30	6.67	7.46	7.89	8.82	12.59	20.41*
	10	5.61	5.76	6.41	6.81	7.23	7.69	8.71	9.27	10.54	16.66	35.78*
	14	6.75	7.00	7.92	8.49	9.12	9.81	11.44	12.41	14.87	35.09	94.69*
800	8	5.14	5.26	5.81	6.14	6.49	6.87	7.69	8.13	9.08	12.91	20.64*
	10	5.79	5.94	6.61	7.02	7.46	7.93	8.97	9.55	10.85	16.99	35.79*
	14	6.97	7.23	8.18	8.76	9.40	10.11	11.77	12.76	15.23	35.11	94.69*
850	8	5.29	5.42	5.98	6.32	6.68	7.07	7.91	8.36	9.34	13.22	20.89*
	10	5.96	6.12	6.81	7.23	7.68	8.16	9.23	9.82	11.14	17.31	35.81*
	14	7.19	7.45	8.42	9.02	9.68	10.40	12.09	13.10	15.59	35.15	94.69*
900	8	5.44	5.57	6.15	6.50	6.87	7.27	8.12	8.58	9.58	13.53	21.14*
	10	6.13	6.30	7.01	7.43	7.90	8.39	9.48	10.08	11.43	17.63	35.83*
	14	7.40	7.67	8.67	9.28	9.95	10.69	12.41	13.43	15.94	35.19	94.69*
950	8	5.59	5.72	6.31	6.67	7.05	7.46	8.33	8.80	9.82	13.82	21.40*
	10	6.30	6.47	7.20	7.63	8.11	8.61	9.72	10.34	11.71	17.95	35.87*
	14	7.61	7.88	8.90	9.53	10.21	10.97	12.72	13.75	16.28	35.24	94.69*
1000	8	5.73	5.86	6.47	6.84	7.23	7.64	8.54	9.02	10.06	14.12	21.67*
	10	6.46	6.64	7.38	7.83	8.31	8.83	9.96	10.59	11.98	18.27	35.91*
	14	7.81	8.09	9.14	9.77	10.47	11.24	13.02	14.06	16.61	35.31	94.69*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 m (RADIUS = 7.1 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	3.09	3.27	4.05	4.72	5.82	7.64	13.44	17.53	28.83	101.83	279.41*
	10	3.44	3.75	5.20	6.89	9.68	13.47	24.69	32.61	54.55	196.78	543.25*
	14	4.21	5.00	10.67	16.32	24.04	34.32	64.89	86.53	146.50	536.09	1486.2*
100	8	3.95	4.17	5.04	5.70	6.61	8.01	13.44	17.53	28.83	101.83	279.41*
	10	4.44	4.80	6.22	7.54	9.82	13.47	24.69	32.61	54.55	196.78	543.25*
	14	5.47	6.28	10.82	16.32	24.04	34.32	64.89	86.53	146.50	536.09	1486.2*
150	8	4.63	4.89	5.85	6.53	7.43	8.68	13.50	17.53	28.83	101.83	279.41*
	10	5.24	5.64	7.13	8.36	10.30	13.56	24.69	32.61	54.55	196.78	543.25*
	14	6.48	7.33	11.35	16.36	24.04	34.32	64.89	86.53	146.50	536.09	1486.2*
200	8	5.23	5.51	6.55	7.27	8.17	9.38	13.71	17.56	28.83	101.83	279.41*
	10	5.94	6.37	7.94	9.15	10.94	13.84	24.69	32.61	54.55	196.78	543.25*
	14	7.35	8.24	12.07	16.54	24.04	34.32	64.89	86.53	146.50	536.09	1486.2*
250	8	5.77	6.08	7.18	7.93	8.86	10.05	14.07	17.67	28.83	101.83	279.41*
	10	6.56	7.03	8.66	9.89	11.62	14.27	24.69	32.61	54.55	196.78	543.25*
	14	8.14	9.07	12.82	16.88	24.07	34.32	64.89	86.53	146.50	536.09	1486.2*
300	8	6.26	6.59	7.76	8.54	9.50	10.69	14.53	17.87	28.83	101.83	279.41*
	10	7.14	7.63	9.34	10.58	12.28	14.78	24.72	32.62	54.55	196.78	543.25*
	14	8.86	9.83	13.57	17.35	24.14	34.32	64.89	86.53	146.50	536.09	1486.2*
350	8	6.73	7.07	8.30	9.12	10.09	11.30	15.02	18.15	28.84	101.83	279.41*
	10	7.67	8.19	9.97	11.24	12.92	15.33	24.78	32.62	54.55	196.78	543.25*
	14	9.53	10.53	14.29	17.89	24.28	34.33	64.89	86.53	146.50	536.09	1486.2*
400	8	7.16	7.53	8.81	9.65	10.66	11.89	15.53	18.51	28.86	101.83	279.41*
	10	8.17	8.71	10.56	11.85	13.54	15.89	24.89	32.63	54.55	196.78	543.25*
	14	10.16	11.20	14.99	18.46	24.50	34.34	64.89	86.53	146.50	536.09	1486.2*
450	8	7.57	7.96	9.29	10.17	11.20	12.44	16.05	18.91	28.90	101.83	279.41*
	10	8.65	9.21	11.12	12.44	14.14	16.45	25.06	32.65	54.55	196.78	543.25*
	14	10.76	11.83	15.66	19.05	24.79	34.37	64.89	86.53	146.50	536.09	1486.2*
500	8	7.97	8.37	9.76	10.65	11.71	12.98	16.57	19.33	28.98	101.83	279.41*
	10	9.11	9.69	11.66	13.01	14.72	17.01	25.28	32.69	54.55	196.78	543.25*
	14	11.34	12.43	16.31	19.64	25.14	34.43	64.89	86.53	146.50	536.09	1486.2*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 m (RADIUS = 7.1 m)³
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}	°C/min											
550	8	8.34	8.76	10.20	11.12	12.20	13.49	17.07	19.77	29.08	101.83	279.41*
	10	9.55	10.15	12.17	13.55	15.28	17.55	25.55	32.76	54.55	196.78	543.25*
	14	11.89	13.01	16.94	20.23	25.54	34.52	64.89	86.53	146.50	536.09	1486.2*
600	8	8.71	9.14	10.62	11.57	12.68	13.98	17.57	20.22	29.23	101.83	279.41*
	10	9.97	10.59	12.67	14.07	15.82	18.09	25.86	32.86	54.55	196.78	543.25*
	14	12.41	13.57	17.54	20.81	25.96	34.65	64.89	86.53	146.50	536.09	1486.2*
650	8	9.06	9.50	11.03	12.00	13.13	14.46	18.06	20.68	29.41	101.83	279.41*
	10	10.38	11.02	13.14	14.57	16.34	18.61	26.20	32.99	54.56	196.78	543.25*
	14	12.92	14.10	18.13	21.39	26.41	34.81	64.89	86.53	146.50	536.09	1486.2*
700	8	9.40	9.86	11.43	12.42	13.58	14.93	18.55	21.13	29.62	101.83	279.41*
	10	10.77	11.43	13.61	15.06	16.85	19.12	26.57	33.15	54.56	196.78	543.25*
	14	13.42	14.62	18.71	21.95	26.87	35.01	64.89	86.53	146.50	536.09	1486.2*
750	8	9.73	10.20	11.81	12.83	14.01	15.38	19.02	21.58	29.86	101.83	279.41*
	10	11.15	11.83	14.06	15.54	17.35	19.63	26.95	33.34	54.56	196.78	543.25*
	14	13.90	15.12	19.26	22.51	27.34	35.25	64.89	86.53	146.50	536.09	1486.2*
800	8	10.05	10.53	12.19	13.23	14.43	15.82	19.48	22.03	30.13	101.83	279.41*
	10	11.53	12.21	14.49	16.00	17.83	20.12	27.34	33.57	54.57	196.78	543.25*
	14	14.36	15.61	19.81	23.05	27.82	35.51	64.89	86.53	146.50	536.09	1486.2*
850	8	10.37	10.86	12.55	13.62	14.84	16.25	19.94	22.47	30.41	101.83	279.41*
	10	11.89	12.59	14.92	16.45	18.30	20.60	27.74	33.81	54.57	196.78	543.25*
	14	14.82	16.09	20.34	23.59	28.30	35.80	64.90	86.53	146.50	536.09	1486.2*
900	8	10.67	11.18	12.91	13.99	15.23	16.67	20.38	22.91	30.72	101.83	279.41*
	10	12.24	12.96	15.33	16.89	18.76	21.07	28.15	34.08	54.59	196.78	543.25*
	14	15.26	16.56	20.85	24.11	28.78	36.12	64.90	86.53	146.50	536.09	1486.2*
950	8	10.97	11.49	13.25	14.36	15.62	17.08	20.82	23.34	31.03	101.83	279.41*
	10	12.59	13.32	15.74	17.32	19.21	21.54	28.56	34.37	54.61	196.78	543.25*
	14	15.69	17.01	21.36	24.63	29.26	36.45	64.91	86.53	146.50	536.09	1486.2*
1000	8	11.27	11.79	13.59	14.72	16.00	17.48	21.25	23.77	31.36	101.83	279.41*
	10	12.93	13.68	16.13	17.73	19.65	21.99	28.97	34.67	54.63	196.78	543.25*
	14	16.12	17.45	21.86	25.14	29.74	36.80	64.92	86.53	146.50	536.09	1486.2*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 m (RADIUS = 7.1 m)
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	6.58	9.89	29.65	46.42	69.36	99.96	191.00	255.49	434.32	1596.7	4432.5*
	10	8.54	17.48	56.24	88.92	133.66	193.33	370.99	496.86	845.98	3115.8	8653.9*
	14	17.76	45.11	151.26	240.82	363.45	527.04	1014.2	1359.5	2317.1	8544.8	23740.*
100	8	8.40	11.01	29.65	46.42	69.36	99.96	191.00	255.49	434.32	1596.7	4432.5*
	10	10.47	17.58	56.24	88.92	133.66	193.33	370.99	496.86	845.98	3115.8	8653.9*
	14	18.17	45.11	151.26	240.82	363.45	527.04	1014.2	1359.5	2317.1	8544.8	23740.*
150	8	9.88	12.33	29.65	46.42	69.36	99.96	191.00	255.49	434.32	1596.7	4432.5*
	10	12.15	18.12	56.24	88.92	133.66	193.33	370.99	496.86	845.98	3115.8	8653.9*
	14	19.32	45.11	151.26	240.82	363.45	527.04	1014.2	1359.5	2317.1	8544.8	23740.*
200	8	11.17	13.58	29.66	46.42	69.36	99.96	191.00	255.49	434.32	1596.7	4432.5*
	10	13.62	19.02	56.24	88.92	133.66	193.33	370.99	496.86	845.98	3115.8	8653.9*
	14	20.74	45.11	151.26	240.82	363.45	527.04	1014.2	1359.5	2317.1	8544.8	23740.*
250	8	12.32	14.73	29.72	46.42	69.36	99.96	191.00	255.49	434.32	1596.7	4432.5*
	10	14.96	20.06	56.24	88.92	133.66	193.33	370.99	496.86	845.98	3115.8	8653.9*
	14	22.17	45.12	151.26	240.82	363.45	527.04	1014.2	1359.5	2317.1	8544.8	23740.*
300	8	13.38	15.82	29.88	46.42	69.36	99.96	191.00	255.49	434.32	1596.7	4432.5*
	10	16.19	21.12	56.24	88.92	133.66	193.33	370.99	496.86	845.98	3115.8	8653.9*
	14	23.57	45.15	151.26	240.82	363.45	527.04	1014.2	1359.5	2317.1	8544.8	23740.*
350	8	14.37	16.84	30.15	46.42	69.36	99.96	191.00	255.49	434.32	1596.7	4432.5*
	10	17.34	22.17	56.24	88.92	133.66	193.33	370.99	496.86	845.98	3115.8	8653.9*
	14	24.92	45.25	151.26	240.82	363.45	527.04	1014.2	1359.5	2317.1	8544.8	23740.*
400	8	15.30	17.80	30.54	46.43	69.36	99.96	191.00	255.49	434.32	1596.7	4432.5*
	10	18.42	23.20	56.24	88.92	133.66	193.33	370.99	496.86	845.98	3115.8	8653.9*
	14	26.21	45.44	151.26	240.82	363.45	527.04	1014.2	1359.5	2317.1	8544.8	23740.*
450	8	16.18	18.72	31.01	46.46	69.36	99.96	191.00	255.49	434.32	1596.7	4432.5*
	10	19.45	24.20	56.25	88.92	133.66	193.33	370.99	496.86	845.98	3115.8	8653.9*
	14	27.45	45.72	151.26	240.82	363.45	527.04	1014.2	1359.5	2317.1	8544.8	23740.*
500	8	17.02	19.60	31.55	46.52	69.37	99.96	191.00	255.49	434.32	1596.7	4432.5*
	10	20.43	25.17	56.27	88.92	133.66	193.33	370.99	496.86	845.98	3115.8	8653.9*
	14	28.65	46.11	151.26	240.82	363.45	527.04	1014.2	1359.5	2317.1	8544.8	23740.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 m (RADIUS = 7.1 m)₃
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	17.83	20.44	32.14	46.61	69.37	99.96	191.00	255.49	434.32	1596.7	4432.5*
	10	21.37	26.11	56.30	88.92	133.66	193.33	370.99	496.86	845.98	3115.8	8653.9*
	14	29.81	46.58	151.26	240.82	363.45	527.04	1014.2	1359.5	2317.1	8544.8	23740.*
600	8	18.61	21.25	32.76	46.75	69.37	99.96	191.00	255.49	434.32	1596.7	4432.5*
	10	22.28	27.02	56.36	88.92	133.66	193.33	370.99	496.86	845.98	3115.8	8653.9*
	14	30.92	47.13	151.26	240.82	363.45	527.04	1014.2	1359.5	2317.1	8544.8	23740.*
650	8	19.35	22.04	33.40	46.93	69.37	99.96	191.00	255.49	434.32	1596.7	4432.5*
	10	23.15	27.91	56.46	88.92	133.66	193.33	370.99	496.86	845.98	3115.8	8653.9*
	14	32.01	47.74	151.26	240.82	363.45	527.04	1014.2	1359.5	2317.1	8544.8	23740.*
700	8	20.08	22.80	34.05	47.15	69.38	99.96	191.00	255.49	434.32	1596.7	4432.5*
	10	24.00	28.78	56.58	88.92	133.66	193.33	370.99	496.86	845.98	3115.8	8653.9*
	14	33.06	48.39	151.26	240.82	363.45	527.04	1014.2	1359.5	2317.1	8544.8	23740.*
750	8	20.78	23.54	34.71	47.42	69.39	99.96	191.00	255.49	434.32	1596.7	4432.5*
	10	24.82	29.62	56.75	88.92	133.66	193.33	370.99	496.86	845.98	3115.8	8653.9*
	14	34.08	49.08	151.26	240.82	363.45	527.04	1014.2	1359.5	2317.1	8544.8	23740.*
800	8	21.47	24.26	35.37	47.73	69.41	99.96	191.00	255.49	434.32	1596.7	4432.5*
	10	25.62	30.44	56.95	88.92	133.66	193.33	370.99	496.86	845.98	3115.8	8653.9*
	14	35.08	49.79	151.26	240.82	363.45	527.04	1014.2	1359.5	2317.1	8544.8	23740.*
850	8	22.13	24.96	36.03	48.08	69.45	99.96	191.00	255.49	434.32	1596.7	4432.5*
	10	26.39	31.24	57.20	88.93	133.66	193.33	370.99	496.86	845.98	3115.8	8653.9*
	14	36.05	50.52	151.26	240.82	363.45	527.04	1014.2	1359.5	2317.1	8544.8	23740.*
900	8	22.78	25.64	36.69	48.46	69.49	99.96	191.00	255.49	434.32	1596.7	4432.5*
	10	27.15	32.03	57.48	88.93	133.66	193.33	370.99	496.86	845.98	3115.8	8653.9*
	14	37.00	51.26	151.26	240.82	363.45	527.04	1014.2	1359.5	2317.1	8544.8	23740.*
950	8	23.42	26.31	37.34	48.86	69.55	99.96	191.00	255.49	434.32	1596.7	4432.5*
	10	27.89	32.80	57.79	88.95	133.66	193.33	370.99	496.86	845.98	3115.8	8653.9*
	14	37.92	52.01	151.26	240.82	363.45	527.04	1014.2	1359.5	2317.1	8544.8	23740.*
1000	8	24.04	26.96	37.99	49.29	69.62	99.96	191.00	255.49	434.32	1596.7	4432.5*
	10	28.62	33.55	58.14	88.96	133.66	193.33	370.99	496.86	845.98	3115.8	8653.9*
	14	38.83	52.77	151.26	240.82	363.45	527.04	1014.2	1359.5	2317.1	8544.8	23740.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.5 m (RADIUS = 7.4 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
		1	2	4	5	6	7	9	10	12	18	24	
50	8	1.18	1.17	1.26	1.31	1.38	1.44	1.58	1.65	1.80	2.30	3.00	
	10	1.24	1.24	1.33	1.40	1.47	1.54	1.70	1.78	1.95	2.60	3.84	
	14	1.36	1.36	1.48	1.56	1.65	1.74	1.94	2.06	2.31	3.65	7.70	
100	8	1.39	1.39	1.49	1.56	1.63	1.71	1.87	1.96	2.14	2.73	3.48	
	10	1.49	1.49	1.61	1.68	1.77	1.85	2.04	2.14	2.35	3.09	4.24	
	14	1.66	1.67	1.82	1.92	2.02	2.13	2.38	2.51	2.80	4.09	7.70	
150	8	1.56	1.56	1.68	1.76	1.84	1.93	2.11	2.21	2.41	3.06	3.88	
	10	1.68	1.69	1.82	1.91	2.01	2.11	2.32	2.43	2.66	3.48	4.66	
	14	1.90	1.92	2.09	2.20	2.32	2.45	2.72	2.87	3.20	4.54	7.76	
200	8	1.71	1.71	1.84	1.93	2.02	2.12	2.32	2.42	2.64	3.36	4.23	
	10	1.85	1.86	2.01	2.11	2.21	2.32	2.56	2.68	2.93	3.82	5.05	
	14	2.11	2.13	2.33	2.45	2.58	2.72	3.03	3.19	3.54	4.95	7.94	
250	8	1.84	1.85	1.99	2.08	2.18	2.29	2.50	2.62	2.85	3.62	4.55	
	10	2.01	2.02	2.18	2.29	2.40	2.52	2.77	2.90	3.18	4.13	5.40	
	14	2.30	2.33	2.54	2.67	2.82	2.97	3.30	3.47	3.85	5.33	8.19	
300	8	1.97	1.97	2.13	2.23	2.33	2.44	2.67	2.79	3.04	3.86	4.84	
	10	2.15	2.16	2.34	2.45	2.57	2.70	2.97	3.11	3.40	4.41	5.74	
	14	2.48	2.51	2.73	2.88	3.03	3.19	3.54	3.73	4.13	5.68	8.48	
350	8	2.08	2.09	2.26	2.36	2.47	2.59	2.83	2.96	3.22	4.09	5.11	
	10	2.28	2.30	2.49	2.61	2.74	2.87	3.15	3.30	3.61	4.67	6.05	
	14	2.64	2.67	2.92	3.07	3.23	3.40	3.78	3.97	4.40	6.00	8.78	
400	8	2.19	2.20	2.38	2.49	2.60	2.73	2.98	3.12	3.39	4.30	5.36	
	10	2.41	2.42	2.63	2.75	2.89	3.03	3.33	3.48	3.81	4.92	6.34	
	14	2.79	2.83	3.09	3.25	3.42	3.60	3.99	4.20	4.65	6.31	9.09	
450	8	2.30	2.31	2.49	2.61	2.73	2.86	3.13	3.27	3.55	4.50	5.61	
	10	2.52	2.55	2.76	2.89	3.03	3.18	3.49	3.66	4.00	5.15	6.62	
	14	2.94	2.98	3.25	3.42	3.60	3.79	4.20	4.42	4.88	6.60	9.40	
500	8	2.39	2.41	2.60	2.72	2.85	2.98	3.26	3.41	3.71	4.69	5.84	
	10	2.64	2.66	2.88	3.02	3.17	3.32	3.65	3.82	4.17	5.37	6.89	
	14	3.08	3.12	3.41	3.58	3.77	3.97	4.40	4.62	5.11	6.89	9.70	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.5 m (RADIUS = 7.4 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	2.49	2.51	2.70	2.83	2.96	3.10	3.39	3.54	3.86	4.87	6.06
	10	2.75	2.77	3.00	3.15	3.30	3.46	3.80	3.98	4.35	5.59	7.15
	14	3.21	3.26	3.56	3.74	3.94	4.14	4.59	4.82	5.32	7.15	10.00
600	8	2.58	2.60	2.80	2.93	3.07	3.22	3.52	3.67	4.00	5.05	6.27
	10	2.85	2.88	3.12	3.27	3.43	3.59	3.95	4.13	4.51	5.79	7.39
	14	3.34	3.39	3.70	3.89	4.09	4.31	4.77	5.01	5.53	7.41	10.29
650	8	2.67	2.69	2.90	3.04	3.18	3.33	3.64	3.80	4.13	5.22	6.48
	10	2.95	2.98	3.23	3.39	3.55	3.72	4.09	4.28	4.67	5.99	7.63
	14	3.47	3.52	3.84	4.04	4.25	4.47	4.94	5.20	5.73	7.66	10.57
700	8	2.76	2.78	3.00	3.14	3.28	3.44	3.76	3.92	4.27	5.38	6.68
	10	3.05	3.08	3.34	3.50	3.67	3.85	4.22	4.42	4.82	6.19	7.87
	14	3.59	3.64	3.97	4.18	4.40	4.63	5.11	5.37	5.92	7.91	10.85
750	8	2.84	2.86	3.09	3.23	3.38	3.54	3.87	4.04	4.40	5.54	6.87
	10	3.15	3.18	3.45	3.61	3.79	3.97	4.35	4.56	4.97	6.37	8.09
	14	3.71	3.76	4.10	4.32	4.54	4.78	5.28	5.55	6.11	8.14	11.12
800	8	2.92	2.94	3.18	3.33	3.48	3.64	3.98	4.16	4.52	5.70	7.06
	10	3.24	3.27	3.55	3.72	3.90	4.09	4.48	4.69	5.12	6.55	8.31
	14	3.82	3.88	4.23	4.45	4.68	4.92	5.44	5.71	6.29	8.37	11.38
850	8	3.00	3.02	3.27	3.42	3.58	3.74	4.09	4.27	4.64	5.85	7.24
	10	3.33	3.37	3.65	3.82	4.01	4.20	4.61	4.82	5.26	6.73	8.52
	14	3.93	3.99	4.36	4.58	4.82	5.07	5.60	5.88	6.47	8.59	11.64
900	8	3.08	3.10	3.35	3.51	3.67	3.84	4.20	4.38	4.76	6.00	7.42
	10	3.42	3.46	3.75	3.93	4.12	4.31	4.73	4.95	5.40	6.90	8.73
	14	4.04	4.11	4.48	4.71	4.95	5.20	5.75	6.04	6.65	8.81	11.89
950	8	3.15	3.18	3.43	3.59	3.76	3.94	4.30	4.49	4.88	6.14	7.59
	10	3.51	3.55	3.84	4.03	4.22	4.42	4.85	5.07	5.53	7.07	8.93
	14	4.15	4.21	4.60	4.83	5.08	5.34	5.90	6.19	6.81	9.02	12.14
1000	8	3.23	3.25	3.52	3.68	3.85	4.03	4.40	4.60	4.99	6.29	7.76
	10	3.59	3.63	3.94	4.12	4.32	4.53	4.97	5.19	5.67	7.24	9.13
	14	4.25	4.32	4.71	4.95	5.21	5.47	6.04	6.34	6.98	9.23	12.39

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.5 m (RADIUS = 7.4 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	1.88	1.89	2.08	2.21	2.35	2.50	2.87	3.09	3.66	8.44	20.46	
	10	2.02	2.05	2.30	2.46	2.64	2.85	3.41	3.81	5.10	14.86	38.06	
	14	2.30	2.37	2.76	3.03	3.39	3.88	5.71	7.22	11.39	37.79	100.97	
100	8	2.31	2.34	2.58	2.73	2.90	3.08	3.50	3.74	4.33	8.46	20.46	
	10	2.52	2.57	2.87	3.06	3.28	3.53	4.12	4.50	5.55	14.86	38.06	
	14	2.92	3.02	3.48	3.79	4.17	4.64	6.10	7.35	11.39	37.79	100.97	
150	8	2.66	2.70	2.97	3.15	3.34	3.55	4.01	4.28	4.89	8.62	20.46	
	10	2.92	2.99	3.33	3.55	3.79	4.07	4.71	5.10	6.12	14.86	38.06	
	14	3.42	3.54	4.06	4.41	4.81	5.30	6.67	7.74	11.42	37.79	100.97	
200	8	2.96	3.01	3.32	3.51	3.72	3.95	4.45	4.74	5.39	8.94	20.46	
	10	3.27	3.35	3.73	3.97	4.24	4.53	5.22	5.63	6.66	14.87	38.06	
	14	3.85	3.99	4.57	4.94	5.37	5.88	7.25	8.24	11.55	37.79	100.97	
250	8	3.24	3.29	3.63	3.83	4.06	4.31	4.85	5.16	5.84	9.32	20.46	
	10	3.59	3.67	4.09	4.35	4.64	4.95	5.68	6.11	7.16	14.91	38.06	
	14	4.25	4.40	5.02	5.42	5.87	6.40	7.79	8.75	11.80	37.79	100.97	
300	8	3.49	3.55	3.91	4.13	4.38	4.64	5.22	5.54	6.26	9.73	20.46	
	10	3.88	3.97	4.42	4.70	5.00	5.34	6.11	6.56	7.63	15.00	38.06	
	14	4.61	4.77	5.43	5.85	6.34	6.89	8.30	9.25	12.13	37.79	100.97	
350	8	3.72	3.79	4.17	4.41	4.67	4.95	5.56	5.89	6.65	10.13	20.48	
	10	4.15	4.25	4.72	5.02	5.35	5.70	6.51	6.97	8.07	15.15	38.06	
	14	4.94	5.12	5.82	6.26	6.77	7.34	8.78	9.73	12.50	37.79	100.97	
400	8	3.95	4.02	4.42	4.67	4.95	5.24	5.88	6.23	7.01	10.54	20.51	
	10	4.40	4.51	5.01	5.33	5.67	6.04	6.88	7.36	8.49	15.36	38.06	
	14	5.26	5.45	6.18	6.65	7.17	7.77	9.24	10.20	12.90	37.79	100.97	
450	8	4.16	4.23	4.66	4.92	5.21	5.51	6.18	6.55	7.36	10.93	20.56	
	10	4.65	4.76	5.29	5.62	5.97	6.36	7.23	7.73	8.89	15.62	38.06	
	14	5.56	5.76	6.53	7.01	7.56	8.17	9.68	10.64	13.30	37.79	100.97	
500	8	4.36	4.44	4.89	5.16	5.46	5.78	6.47	6.85	7.69	11.31	20.64	
	10	4.88	5.00	5.55	5.89	6.26	6.67	7.57	8.08	9.27	15.90	38.06	
	14	5.85	6.05	6.86	7.36	7.92	8.56	10.10	11.07	13.71	37.79	100.97	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.5 m (RADIUS = 7.4 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	4.55	4.64	5.10	5.39	5.70	6.03	6.75	7.14	8.00	11.68	20.75	
	10	5.10	5.23	5.80	6.16	6.54	6.96	7.89	8.42	9.64	16.20	38.06	
	14	6.12	6.34	7.17	7.69	8.28	8.93	10.51	11.49	14.11	37.79	100.97	
600	8	4.74	4.83	5.31	5.61	5.93	6.27	7.01	7.42	8.31	12.05	20.89	
	10	5.32	5.45	6.04	6.41	6.81	7.24	8.21	8.75	9.99	16.51	38.06	
	14	6.39	6.61	7.48	8.01	8.61	9.28	10.90	11.89	14.51	37.79	100.97	
650	8	4.92	5.01	5.51	5.82	6.15	6.50	7.27	7.69	8.60	12.40	21.06	
	10	5.52	5.66	6.28	6.66	7.07	7.51	8.51	9.06	10.33	16.83	38.07	
	14	6.65	6.88	7.77	8.32	8.94	9.63	11.27	12.28	14.90	37.80	100.97	
700	8	5.09	5.19	5.71	6.03	6.37	6.73	7.52	7.95	8.89	12.74	21.25	
	10	5.72	5.87	6.50	6.90	7.32	7.78	8.80	9.37	10.66	17.16	38.07	
	14	6.89	7.13	8.05	8.62	9.26	9.96	11.64	12.66	15.28	37.80	100.97	
750	8	5.26	5.37	5.90	6.23	6.58	6.95	7.76	8.20	9.16	13.08	21.46	
	10	5.92	6.07	6.72	7.13	7.56	8.03	9.08	9.66	10.99	17.48	38.07	
	14	7.14	7.38	8.33	8.91	9.56	10.28	11.99	13.03	15.66	37.81	100.97	
800	8	5.43	5.53	6.08	6.42	6.78	7.16	8.00	8.45	9.43	13.41	21.68	
	10	6.11	6.26	6.94	7.35	7.80	8.28	9.35	9.95	11.30	17.81	38.08	
	14	7.37	7.62	8.60	9.20	9.86	10.60	12.34	13.38	16.03	37.83	100.97	
850	8	5.59	5.70	6.26	6.61	6.98	7.37	8.23	8.69	9.69	13.73	21.92	
	10	6.29	6.45	7.15	7.57	8.03	8.53	9.62	10.23	11.60	18.14	38.09	
	14	7.60	7.86	8.86	9.47	10.15	10.90	12.67	13.73	16.39	37.85	100.97	
900	8	5.74	5.86	6.44	6.79	7.17	7.58	8.45	8.92	9.95	14.04	22.16	
	10	6.48	6.64	7.35	7.78	8.26	8.76	9.88	10.50	11.90	18.46	38.11	
	14	7.82	8.09	9.11	9.74	10.44	11.20	13.00	14.08	16.75	37.88	100.97	
950	8	5.90	6.02	6.61	6.97	7.36	7.77	8.67	9.15	10.20	14.35	22.41	
	10	6.65	6.82	7.55	7.99	8.48	8.99	10.14	10.77	12.19	18.78	38.14	
	14	8.04	8.32	9.36	10.00	10.71	11.49	13.32	14.41	17.10	37.92	100.97	
1000	8	6.05	6.17	6.78	7.15	7.55	7.97	8.88	9.37	10.44	14.65	22.67	
	10	6.82	6.99	7.74	8.20	8.69	9.22	10.39	11.03	12.48	19.10	38.17	
	14	8.26	8.54	9.60	10.26	10.98	11.78	13.64	14.74	17.45	37.96	100.97	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.5 m (RADIUS = 7.4 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	3.26	3.45	4.31	5.08	6.39	8.48	14.87	19.35	31.63	109.98	298.12	
	10	3.65	3.98	5.67	7.70	10.86	15.07	27.45	36.13	60.01	212.66	579.75	
	14	4.49	5.43	12.19	18.57	27.22	38.67	72.41	96.12	161.41	579.61	1586.3	
100	8	4.17	4.41	5.34	6.07	7.11	8.74	14.87	19.35	31.63	109.98	298.12	
	10	4.71	5.10	6.69	8.23	10.94	15.08	27.45	36.13	60.01	212.66	579.75	
	14	5.83	6.75	12.26	18.57	27.22	38.67	72.41	96.12	161.41	579.61	1586.3	
150	8	4.90	5.17	6.19	6.93	7.92	9.35	14.90	19.35	31.63	109.98	298.12	
	10	5.56	5.99	7.62	9.02	11.31	15.12	27.45	36.13	60.01	212.66	579.75	
	14	6.90	7.85	12.65	18.58	27.22	38.67	72.41	96.12	161.41	579.61	1586.3	
200	8	5.54	5.83	6.93	7.70	8.69	10.04	15.04	19.36	31.63	109.98	298.12	
	10	6.29	6.76	8.46	9.82	11.90	15.31	27.45	36.13	60.01	212.66	579.75	
	14	7.83	8.82	13.28	18.68	27.23	38.67	72.41	96.12	161.41	579.61	1586.3	
250	8	6.11	6.42	7.59	8.39	9.40	10.72	15.33	19.42	31.63	109.98	298.12	
	10	6.96	7.45	9.22	10.58	12.55	15.65	27.45	36.13	60.01	212.66	579.75	
	14	8.66	9.69	14.00	18.91	27.23	38.67	72.41	96.12	161.41	579.61	1586.3	
300	8	6.63	6.97	8.20	9.03	10.06	11.38	15.72	19.56	31.64	109.98	298.12	
	10	7.56	8.08	9.92	11.30	13.21	16.11	27.46	36.13	60.01	212.66	579.75	
	14	9.43	10.49	14.74	19.28	27.27	38.67	72.41	96.12	161.41	579.61	1586.3	
350	8	7.12	7.48	8.77	9.63	10.68	12.00	16.18	19.78	31.64	109.98	298.12	
	10	8.13	8.68	10.58	11.97	13.86	16.62	27.49	36.13	60.01	212.66	579.75	
	14	10.14	11.24	15.47	19.74	27.34	38.67	72.41	96.12	161.41	579.61	1586.3	
400	8	7.58	7.96	9.30	10.20	11.27	12.60	16.68	20.08	31.65	109.98	298.12	
	10	8.66	9.23	11.20	12.62	14.49	17.16	27.56	36.14	60.01	212.66	579.75	
	14	10.81	11.94	16.18	20.27	27.48	38.68	72.41	96.12	161.41	579.61	1586.3	
450	8	8.01	8.41	9.81	10.73	11.83	13.18	17.18	20.44	31.67	109.98	298.12	
	10	9.17	9.76	11.79	13.23	15.11	17.71	27.67	36.15	60.01	212.66	579.75	
	14	11.45	12.61	16.87	20.83	27.68	38.69	72.41	96.12	161.41	579.61	1586.3	
500	8	8.43	8.84	10.29	11.24	12.37	13.73	17.69	20.83	31.72	109.98	298.12	
	10	9.65	10.27	12.36	13.82	15.70	18.27	27.83	36.17	60.01	212.66	579.75	
	14	12.05	13.24	17.54	21.40	27.95	38.72	72.41	96.12	161.41	579.61	1586.3	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.5 m (RADIUS = 7.4 m)³
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}	°C/min											
550	8	8.83	9.26	10.76	11.73	12.88	14.27	18.20	21.25	31.79	109.98	298.12
	10	10.12	10.75	12.90	14.38	16.28	18.81	28.04	36.20	60.01	212.66	579.75
	14	12.64	13.85	18.19	21.98	28.27	38.77	72.41	96.12	161.41	579.61	1586.3
600	8	9.22	9.66	11.20	12.20	13.38	14.78	18.71	21.68	31.89	109.98	298.12
	10	10.57	11.22	13.42	14.93	16.83	19.36	28.29	36.26	60.01	212.66	579.75
	14	13.20	14.44	18.82	22.56	28.64	38.84	72.41	96.12	161.41	579.61	1586.3
650	8	9.59	10.04	11.63	12.66	13.86	15.28	19.21	22.12	32.02	109.98	298.12
	10	11.00	11.67	13.92	15.46	17.38	19.89	28.58	36.35	60.01	212.66	579.75
	14	13.74	15.01	19.44	23.13	29.03	38.94	72.41	96.12	161.41	579.61	1586.3
700	8	9.95	10.42	12.05	13.10	14.32	15.76	19.70	22.57	32.19	109.98	298.12
	10	11.41	12.10	14.41	15.97	17.91	20.41	28.90	36.46	60.01	212.66	579.75
	14	14.26	15.56	20.03	23.71	29.45	39.07	72.41	96.12	161.41	579.61	1586.3
750	8	10.30	10.78	12.46	13.53	14.77	16.23	20.18	23.01	32.38	109.98	298.12
	10	11.82	12.52	14.88	16.46	18.42	20.93	29.24	36.60	60.01	212.66	579.75
	14	14.77	16.09	20.61	24.27	29.89	39.24	72.41	96.12	161.41	579.61	1586.3
800	8	10.64	11.13	12.85	13.94	15.21	16.69	20.65	23.46	32.61	109.98	298.12
	10	12.21	12.93	15.34	16.95	18.92	21.43	29.60	36.77	60.01	212.66	579.75
	14	15.26	16.61	21.18	24.83	30.35	39.44	72.41	96.12	161.41	579.61	1586.3
850	8	10.97	11.48	13.23	14.35	15.64	17.14	21.12	23.91	32.86	109.98	298.12
	10	12.60	13.33	15.78	17.42	19.41	21.93	29.98	36.97	60.02	212.66	579.75
	14	15.74	17.11	21.73	25.37	30.81	39.66	72.41	96.12	161.41	579.61	1586.3
900	8	11.30	11.81	13.61	14.74	16.05	17.58	21.57	24.35	33.12	109.98	298.12
	10	12.97	13.72	16.22	17.88	19.89	22.42	30.37	37.19	60.02	212.66	579.75
	14	16.21	17.60	22.28	25.91	31.27	39.92	72.41	96.12	161.41	579.61	1586.3
950	8	11.62	12.14	13.97	15.13	16.46	18.00	22.02	24.79	33.41	109.98	298.12
	10	13.34	14.10	16.65	18.33	20.36	22.90	30.76	37.43	60.03	212.66	579.75
	14	16.67	18.08	22.80	26.44	31.75	40.19	72.41	96.12	161.41	579.61	1586.3
1000	8	11.93	12.46	14.33	15.51	16.86	18.42	22.47	25.22	33.71	109.98	298.12
	10	13.70	14.48	17.06	18.76	20.82	23.37	31.16	37.69	60.04	212.66	579.75
	14	17.12	18.55	23.32	26.97	32.22	40.49	72.42	96.12	161.41	579.61	1586.3

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.5 m (RADIUS = 7.4 m)
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50 (m*s) ^{1/2}	8	7.12	11.36	34.11	53.07	78.81	112.88	213.38	284.05	478.75	1726.6	4731.3	
	10	9.52	20.44	64.89	101.86	152.06	218.54	414.66	552.61	932.71	3369.4	9237.4	
	14	21.00	53.09	174.92	276.23	413.83	596.11	1134.0	1512.4	2555.1	9240.6	25342.	
100	8	9.04	12.24	34.11	53.07	78.81	112.88	213.38	284.05	478.75	1726.6	4731.3	
	10	11.44	20.47	64.89	101.86	152.06	218.54	414.66	552.61	932.71	3369.4	9237.4	
	14	21.19	53.09	174.92	276.23	413.83	596.11	1134.0	1512.4	2555.1	9240.6	25342.	
150	8	10.61	13.52	34.11	53.07	78.81	112.88	213.38	284.05	478.75	1726.6	4731.3	
	10	13.18	20.78	64.89	101.86	152.06	218.54	414.66	552.61	932.71	3369.4	9237.4	
	14	22.02	53.09	174.92	276.23	413.83	596.11	1134.0	1512.4	2555.1	9240.6	25342.	
200	8	11.97	14.79	34.11	53.07	78.81	112.88	213.38	284.05	478.75	1726.6	4731.3	
	10	14.73	21.48	64.89	101.86	152.06	218.54	414.66	552.61	932.71	3369.4	9237.4	
	14	23.28	53.09	174.92	276.23	413.83	596.11	1134.0	1512.4	2555.1	9240.6	25342.	
250	8	13.19	15.98	34.13	53.07	78.81	112.88	213.38	284.05	478.75	1726.6	4731.3	
	10	16.14	22.40	64.89	101.86	152.06	218.54	414.66	552.61	932.71	3369.4	9237.4	
	14	24.66	53.09	174.92	276.23	413.83	596.11	1134.0	1512.4	2555.1	9240.6	25342.	
300	8	14.32	17.11	34.20	53.07	78.81	112.88	213.38	284.05	478.75	1726.6	4731.3	
	10	17.45	23.41	64.89	101.86	152.06	218.54	414.66	552.61	932.71	3369.4	9237.4	
	14	26.06	53.10	174.92	276.23	413.83	596.11	1134.0	1512.4	2555.1	9240.6	25342.	
350	8	15.36	18.17	34.35	53.07	78.81	112.88	213.38	284.05	478.75	1726.6	4731.3	
	10	18.66	24.44	64.89	101.86	152.06	218.54	414.66	552.61	932.71	3369.4	9237.4	
	14	27.43	53.13	174.92	276.23	413.83	596.11	1134.0	1512.4	2555.1	9240.6	25342.	
400	8	16.35	19.18	34.60	53.07	78.81	112.88	213.38	284.05	478.75	1726.6	4731.3	
	10	19.81	25.47	64.89	101.86	152.06	218.54	414.66	552.61	932.71	3369.4	9237.4	
	14	28.76	53.21	174.92	276.23	413.83	596.11	1134.0	1512.4	2555.1	9240.6	25342.	
450	8	17.29	20.15	34.95	53.08	78.81	112.88	213.38	284.05	478.75	1726.6	4731.3	
	10	20.90	26.49	64.90	101.86	152.06	218.54	414.66	552.61	932.71	3369.4	9237.4	
	14	30.04	53.34	174.92	276.23	413.83	596.11	1134.0	1512.4	2555.1	9240.6	25342.	
500	8	18.18	21.07	35.37	53.10	78.81	112.88	213.38	284.05	478.75	1726.6	4731.3	
	10	21.94	27.48	64.90	101.86	152.06	218.54	414.66	552.61	932.71	3369.4	9237.4	
	14	31.29	53.55	174.92	276.23	413.83	596.11	1134.0	1512.4	2555.1	9240.6	25342.	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.5 m (RADIUS = 7.4 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	19.03	21.96	35.87	53.14	78.81	112.88	213.38	284.05	478.75	1726.6	4731.3
	10	22.93	28.45	64.91	101.86	152.06	218.54	414.66	552.61	932.71	3369.4	9237.4
	14	32.50	53.84	174.92	276.23	413.83	596.11	1134.0	1512.4	2555.1	9240.6	25342.
600	8	19.86	22.81	36.41	53.21	78.81	112.88	213.38	284.05	478.75	1726.6	4731.3
	10	23.89	29.39	64.93	101.86	152.06	218.54	414.66	552.61	932.71	3369.4	9237.4
	14	33.67	54.21	174.92	276.23	413.83	596.11	1134.0	1512.4	2555.1	9240.6	25342.
650	8	20.65	23.64	36.99	53.31	78.81	112.88	213.38	284.05	478.75	1726.6	4731.3
	10	24.82	30.31	64.97	101.86	152.06	218.54	414.66	552.61	932.71	3369.4	9237.4
	14	34.80	54.66	174.92	276.23	413.83	596.11	1134.0	1512.4	2555.1	9240.6	25342.
700	8	21.42	24.44	37.59	53.44	78.81	112.88	213.38	284.05	478.75	1726.6	4731.3
	10	25.72	31.21	65.03	101.86	152.06	218.54	414.66	552.61	932.71	3369.4	9237.4
	14	35.91	55.17	174.92	276.23	413.83	596.11	1134.0	1512.4	2555.1	9240.6	25342.
750	8	22.17	25.22	38.22	53.61	78.81	112.88	213.38	284.05	478.75	1726.6	4731.3
	10	26.59	32.09	65.11	101.86	152.06	218.54	414.66	552.61	932.71	3369.4	9237.4
	14	36.98	55.73	174.92	276.23	413.83	596.11	1134.0	1512.4	2555.1	9240.6	25342.
800	8	22.89	25.98	38.85	53.82	78.82	112.88	213.38	284.05	478.75	1726.6	4731.3
	10	27.44	32.95	65.22	101.86	152.06	218.54	414.66	552.61	932.71	3369.4	9237.4
	14	38.03	56.33	174.92	276.23	413.83	596.11	1134.0	1512.4	2555.1	9240.6	25342.
850	8	23.60	26.72	39.49	54.07	78.83	112.88	213.38	284.05	478.75	1726.6	4731.3
	10	28.26	33.79	65.36	101.86	152.06	218.54	414.66	552.61	932.71	3369.4	9237.4
	14	39.05	56.97	174.92	276.23	413.83	596.11	1134.0	1512.4	2555.1	9240.6	25342.
900	8	24.29	27.44	40.14	54.35	78.85	112.88	213.38	284.05	478.75	1726.6	4731.3
	10	29.06	34.61	65.53	101.86	152.06	218.54	414.66	552.61	932.71	3369.4	9237.4
	14	40.06	57.64	174.92	276.23	413.83	596.11	1134.0	1512.4	2555.1	9240.6	25342.
950	8	24.96	28.15	40.78	54.67	78.88	112.88	213.38	284.05	478.75	1726.6	4731.3
	10	29.85	35.42	65.74	101.86	152.06	218.54	414.66	552.61	932.71	3369.4	9237.4
	14	41.03	58.33	174.92	276.23	413.83	596.11	1134.0	1512.4	2555.1	9240.6	25342.
1000	8	25.62	28.84	41.43	55.02	78.91	112.88	213.38	284.05	478.75	1726.6	4731.3
	10	30.62	36.21	65.98	101.87	152.06	218.54	414.66	552.61	932.71	3369.4	9237.4
	14	41.99	59.03	174.92	276.23	413.83	596.11	1134.0	1512.4	2555.1	9240.6	25342.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.0 m (RADIUS = 7.8 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	1.24	1.22	1.30	1.36	1.42	1.49	1.63	1.70	1.85	2.36	3.08	
	10	1.30	1.29	1.39	1.45	1.52	1.59	1.75	1.83	2.01	2.68	3.99	
	14	1.43	1.43	1.54	1.62	1.71	1.80	2.01	2.13	2.39	3.83	8.12	
100	8	1.46	1.45	1.55	1.62	1.69	1.77	1.93	2.02	2.20	2.80	3.57	
	10	1.56	1.55	1.67	1.75	1.83	1.92	2.11	2.21	2.42	3.18	4.38	
	14	1.74	1.75	1.90	1.99	2.10	2.21	2.46	2.60	2.90	4.26	8.13	
150	8	1.64	1.63	1.75	1.82	1.91	2.00	2.18	2.28	2.48	3.14	3.98	
	10	1.76	1.76	1.90	1.99	2.08	2.18	2.39	2.51	2.74	3.58	4.80	
	14	2.00	2.01	2.18	2.29	2.41	2.54	2.82	2.98	3.31	4.71	8.17	
200	8	1.79	1.79	1.92	2.00	2.10	2.19	2.39	2.50	2.72	3.45	4.34	
	10	1.94	1.95	2.10	2.19	2.30	2.41	2.64	2.77	3.02	3.93	5.20	
	14	2.22	2.24	2.43	2.55	2.68	2.83	3.14	3.30	3.66	5.13	8.32	
250	8	1.94	1.93	2.07	2.17	2.26	2.37	2.59	2.70	2.93	3.72	4.66	
	10	2.11	2.11	2.27	2.38	2.49	2.61	2.87	3.00	3.28	4.25	5.56	
	14	2.42	2.44	2.65	2.78	2.93	3.08	3.42	3.60	3.98	5.51	8.56	
300	8	2.07	2.07	2.22	2.31	2.42	2.53	2.76	2.88	3.13	3.96	4.96	
	10	2.26	2.26	2.44	2.55	2.67	2.80	3.07	3.21	3.51	4.54	5.90	
	14	2.60	2.63	2.85	3.00	3.15	3.32	3.67	3.87	4.28	5.87	8.84	
350	8	2.19	2.19	2.35	2.45	2.57	2.68	2.93	3.06	3.32	4.20	5.24	
	10	2.40	2.41	2.59	2.71	2.84	2.98	3.26	3.41	3.73	4.81	6.22	
	14	2.77	2.80	3.04	3.20	3.36	3.54	3.91	4.12	4.55	6.21	9.14	
400	8	2.30	2.31	2.48	2.59	2.70	2.83	3.08	3.22	3.50	4.41	5.50	
	10	2.53	2.54	2.74	2.86	3.00	3.14	3.44	3.60	3.93	5.06	6.52	
	14	2.94	2.97	3.22	3.39	3.56	3.74	4.14	4.35	4.81	6.52	9.44	
450	8	2.41	2.42	2.59	2.71	2.83	2.96	3.23	3.37	3.66	4.62	5.75	
	10	2.65	2.67	2.87	3.01	3.15	3.30	3.61	3.78	4.12	5.30	6.81	
	14	3.09	3.13	3.40	3.56	3.75	3.94	4.36	4.58	5.05	6.83	9.75	
500	8	2.52	2.52	2.71	2.83	2.96	3.09	3.37	3.52	3.82	4.82	5.99	
	10	2.77	2.79	3.01	3.14	3.29	3.45	3.78	3.95	4.31	5.53	7.08	
	14	3.24	3.28	3.56	3.74	3.93	4.13	4.56	4.79	5.28	7.11	10.06	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.0 m (RADIUS = 7.8 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	2.62	2.62	2.82	2.94	3.08	3.22	3.51	3.66	3.98	5.01	6.21	
	10	2.89	2.90	3.13	3.28	3.43	3.59	3.93	4.11	4.49	5.75	7.35	
	14	3.38	3.42	3.71	3.90	4.10	4.31	4.76	5.00	5.51	7.39	10.36	
600	8	2.71	2.72	2.92	3.05	3.19	3.34	3.64	3.80	4.12	5.19	6.43	
	10	3.00	3.02	3.25	3.40	3.56	3.73	4.09	4.27	4.66	5.96	7.60	
	14	3.52	3.56	3.87	4.06	4.26	4.48	4.95	5.19	5.72	7.66	10.65	
650	8	2.81	2.82	3.03	3.16	3.30	3.45	3.77	3.93	4.26	5.36	6.64	
	10	3.11	3.13	3.37	3.53	3.69	3.87	4.23	4.42	4.82	6.17	7.85	
	14	3.65	3.69	4.01	4.21	4.42	4.65	5.13	5.38	5.93	7.92	10.94	
700	8	2.90	2.91	3.13	3.26	3.41	3.56	3.89	4.06	4.40	5.53	6.85	
	10	3.21	3.23	3.48	3.64	3.82	4.00	4.37	4.57	4.98	6.37	8.09	
	14	3.78	3.82	4.15	4.36	4.58	4.81	5.31	5.57	6.13	8.17	11.22	
750	8	2.98	3.00	3.22	3.36	3.52	3.67	4.01	4.18	4.54	5.70	7.05	
	10	3.31	3.33	3.60	3.76	3.94	4.12	4.51	4.71	5.14	6.56	8.32	
	14	3.90	3.95	4.29	4.50	4.73	4.97	5.48	5.75	6.32	8.41	11.50	
800	8	3.07	3.08	3.31	3.46	3.62	3.78	4.12	4.30	4.67	5.86	7.24	
	10	3.41	3.43	3.70	3.87	4.05	4.24	4.64	4.85	5.29	6.75	8.54	
	14	4.02	4.07	4.42	4.64	4.87	5.12	5.64	5.92	6.51	8.64	11.77	
850	8	3.15	3.17	3.41	3.56	3.72	3.88	4.23	4.42	4.79	6.02	7.43	
	10	3.50	3.53	3.81	3.98	4.17	4.36	4.77	4.99	5.43	6.93	8.76	
	14	4.14	4.19	4.55	4.78	5.02	5.27	5.81	6.09	6.70	8.87	12.03	
900	8	3.24	3.25	3.49	3.65	3.81	3.98	4.34	4.53	4.92	6.17	7.61	
	10	3.60	3.63	3.91	4.09	4.28	4.48	4.90	5.12	5.58	7.11	8.97	
	14	4.26	4.31	4.68	4.91	5.15	5.41	5.97	6.26	6.88	9.10	12.29	
950	8	3.31	3.33	3.58	3.74	3.91	4.08	4.45	4.64	5.04	6.32	7.79	
	10	3.69	3.72	4.01	4.19	4.39	4.59	5.02	5.25	5.72	7.28	9.18	
	14	4.37	4.42	4.80	5.04	5.29	5.55	6.12	6.42	7.05	9.32	12.54	
1000	8	3.39	3.41	3.67	3.83	4.00	4.18	4.56	4.75	5.15	6.46	7.96	
	10	3.78	3.81	4.11	4.30	4.50	4.71	5.15	5.38	5.85	7.45	9.38	
	14	4.48	4.54	4.92	5.16	5.42	5.69	6.27	6.58	7.23	9.53	12.79	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.0 m (RADIUS = 7.8 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE RATE
 TIME INDEX OF RISE

CEILING HEIGHT, m

(m*s)^{1/2} °C/min

		1	2	4	5	6	7	9	10	12	18	24
50	8	1.97	1.98	2.17	2.30	2.44	2.60	2.98	3.21	3.83	9.00	21.71
	10	2.12	2.15	2.40	2.56	2.76	2.98	3.59	4.02	5.47	15.93	40.48
	14	2.42	2.50	2.90	3.20	3.59	4.14	6.24	7.89	12.41	40.70	107.56
100	8	2.43	2.45	2.69	2.85	3.02	3.21	3.64	3.89	4.51	9.01	21.71
	10	2.65	2.70	3.00	3.20	3.43	3.68	4.31	4.72	5.87	15.93	40.48
	14	3.07	3.18	3.66	3.99	4.39	4.90	6.55	7.97	12.41	40.70	107.56
150	8	2.80	2.83	3.10	3.28	3.48	3.69	4.17	4.45	5.09	9.14	21.71
	10	3.08	3.14	3.48	3.71	3.96	4.24	4.92	5.33	6.43	15.93	40.48
	14	3.60	3.73	4.27	4.63	5.06	5.58	7.10	8.31	12.43	40.70	107.56
200	8	3.12	3.16	3.46	3.66	3.88	4.11	4.63	4.92	5.61	9.42	21.71
	10	3.44	3.51	3.90	4.15	4.43	4.73	5.45	5.88	6.98	15.94	40.48
	14	4.06	4.20	4.80	5.19	5.64	6.18	7.67	8.78	12.52	40.70	107.56
250	8	3.40	3.45	3.79	4.00	4.23	4.48	5.04	5.36	6.07	9.79	21.71
	10	3.78	3.86	4.28	4.55	4.84	5.17	5.93	6.38	7.49	15.96	40.48
	14	4.48	4.63	5.27	5.69	6.17	6.73	8.22	9.28	12.72	40.70	107.56
300	8	3.67	3.72	4.09	4.31	4.56	4.83	5.42	5.75	6.50	10.18	21.71
	10	4.08	4.17	4.62	4.91	5.23	5.57	6.37	6.84	7.97	16.03	40.48
	14	4.86	5.02	5.71	6.14	6.65	7.23	8.75	9.79	13.00	40.70	107.56
350	8	3.92	3.98	4.36	4.60	4.87	5.15	5.78	6.12	6.90	10.59	21.72
	10	4.37	4.46	4.95	5.25	5.58	5.95	6.78	7.27	8.43	16.15	40.48
	14	5.21	5.39	6.11	6.57	7.10	7.70	9.25	10.28	13.35	40.70	107.56
400	8	4.15	4.22	4.62	4.88	5.16	5.45	6.11	6.47	7.28	10.99	21.74
	10	4.64	4.74	5.25	5.57	5.92	6.30	7.17	7.67	8.86	16.33	40.48
	14	5.54	5.73	6.49	6.97	7.52	8.15	9.72	10.75	13.73	40.70	107.56
450	8	4.37	4.44	4.87	5.14	5.43	5.74	6.42	6.80	7.64	11.39	21.78
	10	4.89	5.00	5.54	5.87	6.24	6.64	7.54	8.06	9.27	16.55	40.48
	14	5.86	6.06	6.85	7.36	7.92	8.57	10.17	11.21	14.12	40.70	107.56
500	8	4.59	4.66	5.11	5.39	5.69	6.01	6.72	7.11	7.98	11.78	21.84
	10	5.14	5.25	5.81	6.16	6.54	6.95	7.89	8.42	9.67	16.81	40.48
	14	6.17	6.37	7.20	7.72	8.31	8.97	10.61	11.65	14.52	40.70	107.56

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.0 m (RADIUS = 7.8 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	4.79	4.87	5.34	5.63	5.94	6.28	7.01	7.42	8.31	12.16	21.93	
	10	5.37	5.49	6.07	6.44	6.83	7.26	8.23	8.78	10.05	17.10	40.48	
	14	6.46	6.67	7.53	8.07	8.68	9.36	11.03	12.08	14.92	40.70	107.56	
600	8	4.99	5.07	5.55	5.86	6.18	6.53	7.29	7.71	8.62	12.53	22.05	
	10	5.60	5.72	6.33	6.70	7.11	7.56	8.55	9.11	10.41	17.40	40.48	
	14	6.74	6.96	7.85	8.40	9.03	9.73	11.43	12.49	15.32	40.70	107.56	
650	8	5.18	5.26	5.77	6.08	6.41	6.77	7.56	7.99	8.93	12.89	22.20	
	10	5.82	5.95	6.57	6.96	7.38	7.84	8.86	9.44	10.76	17.71	40.48	
	14	7.01	7.24	8.16	8.73	9.37	10.09	11.82	12.89	15.72	40.70	107.56	
700	8	5.36	5.45	5.97	6.29	6.64	7.01	7.82	8.26	9.22	13.24	22.37	
	10	6.03	6.17	6.81	7.21	7.64	8.11	9.17	9.76	11.11	18.03	40.48	
	14	7.27	7.51	8.45	9.04	9.70	10.44	12.20	13.28	16.11	40.70	107.56	
750	8	5.54	5.63	6.17	6.50	6.86	7.24	8.07	8.52	9.51	13.59	22.56	
	10	6.24	6.38	7.04	7.45	7.90	8.38	9.46	10.06	11.44	18.35	40.48	
	14	7.53	7.77	8.74	9.35	10.02	10.77	12.57	13.66	16.49	40.71	107.56	
800	8	5.71	5.81	6.36	6.70	7.07	7.46	8.31	8.78	9.79	13.92	22.77	
	10	6.44	6.58	7.26	7.69	8.15	8.64	9.74	10.36	11.76	18.68	40.49	
	14	7.77	8.03	9.02	9.64	10.33	11.10	12.93	14.03	16.87	40.72	107.56	
850	8	5.88	5.99	6.55	6.90	7.28	7.68	8.55	9.02	10.06	14.25	22.99	
	10	6.63	6.78	7.48	7.92	8.39	8.89	10.02	10.65	12.08	19.00	40.50	
	14	8.02	8.28	9.30	9.93	10.64	11.42	13.28	14.40	17.24	40.73	107.56	
900	8	6.05	6.15	6.73	7.09	7.48	7.89	8.78	9.27	10.32	14.57	23.22	
	10	6.82	6.98	7.70	8.14	8.62	9.14	10.29	10.94	12.39	19.33	40.51	
	14	8.25	8.52	9.56	10.21	10.93	11.73	13.62	14.75	17.61	40.75	107.56	
950	8	6.21	6.32	6.91	7.28	7.68	8.10	9.01	9.50	10.58	14.89	23.47	
	10	7.01	7.17	7.90	8.36	8.85	9.38	10.56	11.21	12.69	19.65	40.53	
	14	8.48	8.75	9.82	10.49	11.22	12.03	13.95	15.09	17.97	40.77	107.56	
1000	8	6.37	6.48	7.09	7.47	7.87	8.30	9.23	9.74	10.83	15.20	23.72	
	10	7.19	7.35	8.11	8.57	9.08	9.62	10.82	11.48	12.98	19.97	40.55	
	14	8.71	8.99	10.08	10.75	11.50	12.33	14.27	15.43	18.32	40.81	107.56	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.0 m (RADIUS = 7.8 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	3.44	3.64	4.59	5.49	7.03	9.39	16.42	21.31	34.65	118.61	317.75	
	10	3.86	4.23	6.21	8.62	12.16	16.83	30.45	39.93	65.87	229.49	618.08	
	14	4.79	5.90	13.87	21.06	30.73	43.44	80.57	106.49	177.43	625.73	1691.4	
100	8	4.40	4.65	5.66	6.47	7.66	9.57	16.42	21.31	34.65	118.61	317.75	
	10	4.98	5.40	7.19	9.01	12.20	16.84	30.45	39.93	65.87	229.49	618.08	
	14	6.20	7.26	13.90	21.06	30.73	43.44	80.57	106.49	177.43	625.73	1691.4	
150	8	5.18	5.46	6.55	7.36	8.46	10.10	16.44	21.31	34.65	118.61	317.75	
	10	5.88	6.34	8.14	9.76	12.46	16.85	30.45	39.93	65.87	229.49	618.08	
	14	7.34	8.41	14.15	21.06	30.73	43.44	80.57	106.49	177.43	625.73	1691.4	
200	8	5.84	6.15	7.32	8.15	9.24	10.76	16.52	21.32	34.65	118.61	317.75	
	10	6.66	7.15	9.01	10.55	12.97	16.97	30.45	39.93	65.87	229.49	618.08	
	14	8.32	9.42	14.68	21.10	30.73	43.44	80.57	106.49	177.43	625.73	1691.4	
250	8	6.45	6.78	8.01	8.88	9.97	11.44	16.73	21.35	34.65	118.61	317.75	
	10	7.36	7.88	9.80	11.32	13.58	17.22	30.45	39.93	65.87	229.49	618.08	
	14	9.20	10.34	15.34	21.24	30.73	43.44	80.57	106.49	177.43	625.73	1691.4	
300	8	7.00	7.35	8.65	9.54	10.66	12.11	17.06	21.44	34.65	118.61	317.75	
	10	8.00	8.55	10.54	12.06	14.22	17.60	30.45	39.93	65.87	229.49	618.08	
	14	10.01	11.18	16.05	21.50	30.74	43.44	80.57	106.49	177.43	625.73	1691.4	
350	8	7.52	7.89	9.25	10.17	11.30	12.75	17.47	21.60	34.65	118.61	317.75	
	10	8.60	9.18	11.23	12.76	14.87	18.06	30.47	39.93	65.87	229.49	618.08	
	14	10.76	11.97	16.78	21.87	30.78	43.44	80.57	106.49	177.43	625.73	1691.4	
400	8	8.00	8.39	9.81	10.76	11.92	13.37	17.93	21.84	34.66	118.61	317.75	
	10	9.16	9.77	11.88	13.42	15.51	18.57	30.50	39.93	65.87	229.49	618.08	
	14	11.47	12.71	17.49	22.33	30.85	43.44	80.57	106.49	177.43	625.73	1691.4	
450	8	8.46	8.87	10.34	11.32	12.50	13.96	18.42	22.13	34.67	118.61	317.75	
	10	9.70	10.32	12.50	14.06	16.14	19.10	30.57	39.94	65.87	229.49	618.08	
	14	12.15	13.41	18.19	22.83	30.98	43.44	80.57	106.49	177.43	625.73	1691.4	
500	8	8.90	9.33	10.85	11.85	13.06	14.53	18.92	22.48	34.69	118.61	317.75	
	10	10.21	10.86	13.09	14.67	16.75	19.64	30.67	39.95	65.87	229.49	618.08	
	14	12.79	14.08	18.88	23.37	31.16	43.45	80.57	106.49	177.43	625.73	1691.4	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.0 m (RADIUS = 7.8 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	9.33	9.77	11.34	12.37	13.59	15.08	19.42	22.87	34.74	118.61	317.75	
	10	10.70	11.37	13.65	15.26	17.34	20.19	30.82	39.97	65.87	229.49	618.08	
	14	13.40	14.73	19.55	23.93	31.40	43.47	80.57	106.49	177.43	625.73	1691.4	
600	8	9.73	10.19	11.80	12.86	14.11	15.62	19.93	23.27	34.80	118.61	317.75	
	10	11.17	11.86	14.20	15.83	17.92	20.73	31.01	40.00	65.87	229.49	618.08	
	14	14.00	15.35	20.20	24.49	31.69	43.51	80.57	106.49	177.43	625.73	1691.4	
650	8	10.13	10.59	12.25	13.34	14.61	16.13	20.43	23.70	34.90	118.61	317.75	
	10	11.63	12.33	14.72	16.38	18.48	21.27	31.24	40.05	65.87	229.49	618.08	
	14	14.57	15.94	20.83	25.06	32.02	43.57	80.57	106.49	177.43	625.73	1691.4	
700	8	10.51	10.99	12.69	13.80	15.09	16.64	20.92	24.13	35.02	118.61	317.75	
	10	12.07	12.79	15.23	16.91	19.02	21.80	31.51	40.12	65.87	229.49	618.08	
	14	15.12	16.52	21.45	25.63	32.39	43.65	80.57	106.49	177.43	625.73	1691.4	
750	8	10.88	11.37	13.12	14.24	15.56	17.12	21.41	24.57	35.17	118.61	317.75	
	10	12.50	13.23	15.73	17.43	19.55	22.33	31.80	40.22	65.87	229.49	618.08	
	14	15.66	17.08	22.05	26.20	32.78	43.75	80.57	106.49	177.43	625.73	1691.4	
800	8	11.24	11.74	13.53	14.68	16.02	17.60	21.90	25.01	35.35	118.61	317.75	
	10	12.92	13.67	16.21	17.93	20.08	22.84	32.13	40.34	65.87	229.49	618.08	
	14	16.18	17.63	22.64	26.76	33.19	43.88	80.57	106.49	177.43	625.73	1691.4	
850	8	11.59	12.10	13.93	15.10	16.46	18.06	22.37	25.45	35.55	118.61	317.75	
	10	13.32	14.09	16.68	18.43	20.58	23.35	32.47	40.48	65.87	229.49	618.08	
	14	16.69	18.16	23.22	27.31	33.62	44.04	80.57	106.49	177.43	625.73	1691.4	
900	8	11.93	12.46	14.32	15.52	16.90	18.52	22.84	25.90	35.78	118.61	317.75	
	10	13.72	14.50	17.14	18.91	21.08	23.85	32.83	40.65	65.87	229.49	618.08	
	14	17.19	18.68	23.78	27.86	34.06	44.23	80.57	106.49	177.43	625.73	1691.4	
950	8	12.27	12.80	14.70	15.92	17.32	18.96	23.30	26.34	36.03	118.61	317.75	
	10	14.11	14.90	17.58	19.37	21.57	24.34	33.20	40.85	65.88	229.49	618.08	
	14	17.67	19.19	24.33	28.41	34.51	44.45	80.57	106.49	177.43	625.73	1691.4	
1000	8	12.59	13.14	15.08	16.31	17.74	19.40	23.75	26.78	36.29	118.61	317.75	
	10	14.48	15.29	18.02	19.83	22.05	24.82	33.58	41.06	65.88	229.49	618.08	
	14	18.15	19.68	24.87	28.94	34.97	44.68	80.57	106.49	177.43	625.73	1691.4	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.0 m (RADIUS = 7.8 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	7.72	13.05	39.07	60.42	89.20	127.04	237.69	314.96	526.52	1864.2	5045.0	
	10	10.68	23.76	74.53	116.18	172.30	246.14	462.08	612.92	1026.0	3638.3	9850.1	
	14	24.70	62.11	201.27	315.42	469.29	671.76	1264.0	1677.8	2810.9	9978.2	27023.	
100	8	9.72	13.69	39.07	60.42	89.20	127.04	237.69	314.96	526.52	1864.2	5045.0	
	10	12.52	23.77	74.53	116.18	172.30	246.14	462.08	612.92	1026.0	3638.3	9850.1	
	14	24.76	62.11	201.27	315.42	469.29	671.76	1264.0	1677.8	2810.9	9978.2	27023.	
150	8	11.37	14.87	39.07	60.42	89.20	127.04	237.69	314.96	526.52	1864.2	5045.0	
	10	14.31	23.92	74.53	116.18	172.30	246.14	462.08	612.92	1026.0	3638.3	9850.1	
	14	25.27	62.11	201.27	315.42	469.29	671.76	1264.0	1677.8	2810.9	9978.2	27023.	
200	8	12.80	16.13	39.07	60.42	89.20	127.04	237.69	314.96	526.52	1864.2	5045.0	
	10	15.93	24.39	74.53	116.18	172.30	246.14	462.08	612.92	1026.0	3638.3	9850.1	
	14	26.29	62.11	201.27	315.42	469.29	671.76	1264.0	1677.8	2810.9	9978.2	27023.	
250	8	14.10	17.35	39.07	60.42	89.20	127.04	237.69	314.96	526.52	1864.2	5045.0	
	10	17.41	25.14	74.53	116.18	172.30	246.14	462.08	612.92	1026.0	3638.3	9850.1	
	14	27.55	62.11	201.27	315.42	469.29	671.76	1264.0	1677.8	2810.9	9978.2	27023.	
300	8	15.29	18.51	39.10	60.42	89.20	127.04	237.69	314.96	526.52	1864.2	5045.0	
	10	18.78	26.04	74.53	116.18	172.30	246.14	462.08	612.92	1026.0	3638.3	9850.1	
	14	28.90	62.11	201.27	315.42	469.29	671.76	1264.0	1677.8	2810.9	9978.2	27023.	
350	8	16.40	19.61	39.17	60.42	89.20	127.04	237.69	314.96	526.52	1864.2	5045.0	
	10	20.06	27.02	74.53	116.18	172.30	246.14	462.08	612.92	1026.0	3638.3	9850.1	
	14	30.26	62.12	201.27	315.42	469.29	671.76	1264.0	1677.8	2810.9	9978.2	27023.	
400	8	17.44	20.66	39.31	60.42	89.20	127.04	237.69	314.96	526.52	1864.2	5045.0	
	10	21.27	28.03	74.53	116.18	172.30	246.14	462.08	612.92	1026.0	3638.3	9850.1	
	14	31.60	62.14	201.27	315.42	469.29	671.76	1264.0	1677.8	2810.9	9978.2	27023.	
450	8	18.43	21.67	39.53	60.43	89.20	127.04	237.69	314.96	526.52	1864.2	5045.0	
	10	22.42	29.04	74.53	116.18	172.30	246.14	462.08	612.92	1026.0	3638.3	9850.1	
	14	32.91	62.19	201.27	315.42	469.29	671.76	1264.0	1677.8	2810.9	9978.2	27023.	
500	8	19.37	22.64	39.83	60.43	89.20	127.04	237.69	314.96	526.52	1864.2	5045.0	
	10	23.52	30.04	74.53	116.18	172.30	246.14	462.08	612.92	1026.0	3638.3	9850.1	
	14	34.19	62.28	201.27	315.42	469.29	671.76	1264.0	1677.8	2810.9	9978.2	27023.	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.0 m (RADIUS = 7.8 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1 2 3 4 5 6 7 8 9 10 11 12										
		(m*s) ^{1/2}										
550	8	20.28	23.57	40.20	60.45	89.20	127.04	237.69	314.96	526.52	1864.2	5045.0
	10	24.57	31.02	74.53	116.18	172.30	246.14	462.08	612.92	1026.0	3638.3	9850.1
	14	35.44	62.43	201.27	315.42	469.29	671.76	1264.0	1677.8	2810.9	9978.2	27023.
600	8	21.15	24.47	40.64	60.48	89.20	127.04	237.69	314.96	526.52	1864.2	5045.0
	10	25.59	31.99	74.54	116.18	172.30	246.14	462.08	612.92	1026.0	3638.3	9850.1
	14	36.65	62.64	201.27	315.42	469.29	671.76	1264.0	1677.8	2810.9	9978.2	27023.
650	8	21.99	25.34	41.13	60.52	89.20	127.04	237.69	314.96	526.52	1864.2	5045.0
	10	26.57	32.94	74.55	116.18	172.30	246.14	462.08	612.92	1026.0	3638.3	9850.1
	14	37.84	62.91	201.27	315.42	469.29	671.76	1264.0	1677.8	2810.9	9978.2	27023.
700	8	22.81	26.18	41.66	60.59	89.20	127.04	237.69	314.96	526.52	1864.2	5045.0
	10	27.52	33.86	74.57	116.18	172.30	246.14	462.08	612.92	1026.0	3638.3	9850.1
	14	38.99	63.25	201.27	315.42	469.29	671.76	1264.0	1677.8	2810.9	9978.2	27023.
750	8	23.60	27.00	42.22	60.68	89.20	127.04	237.69	314.96	526.52	1864.2	5045.0
	10	28.44	34.77	74.61	116.18	172.30	246.14	462.08	612.92	1026.0	3638.3	9850.1
	14	40.11	63.66	201.27	315.42	469.29	671.76	1264.0	1677.8	2810.9	9978.2	27023.
800	8	24.36	27.80	42.81	60.81	89.20	127.04	237.69	314.96	526.52	1864.2	5045.0
	10	29.33	35.66	74.66	116.18	172.30	246.14	462.08	612.92	1026.0	3638.3	9850.1
	14	41.21	64.12	201.27	315.42	469.29	671.76	1264.0	1677.8	2810.9	9978.2	27023.
850	8	25.11	28.58	43.41	60.96	89.21	127.04	237.69	314.96	526.52	1864.2	5045.0
	10	30.20	36.54	74.72	116.18	172.30	246.14	462.08	612.92	1026.0	3638.3	9850.1
	14	42.28	64.62	201.27	315.42	469.29	671.76	1264.0	1677.8	2810.9	9978.2	27023.
900	8	25.84	29.33	44.02	61.15	89.21	127.04	237.69	314.96	526.52	1864.2	5045.0
	10	31.05	37.39	74.81	116.18	172.30	246.14	462.08	612.92	1026.0	3638.3	9850.1
	14	43.33	65.17	201.27	315.42	469.29	671.76	1264.0	1677.8	2810.9	9978.2	27023.
950	8	26.55	30.08	44.65	61.37	89.22	127.04	237.69	314.96	526.52	1864.2	5045.0
	10	31.89	38.23	74.93	116.18	172.30	246.14	462.08	612.92	1026.0	3638.3	9850.1
	14	44.36	65.75	201.27	315.42	469.29	671.76	1264.0	1677.8	2810.9	9978.2	27023.
1000	8	27.25	30.80	45.28	61.62	89.23	127.04	237.69	314.96	526.52	1864.2	5045.0
	10	32.70	39.05	75.07	116.18	172.30	246.14	462.08	612.92	1026.0	3638.3	9850.1
	14	45.37	66.37	201.27	315.42	469.29	671.76	1264.0	1677.8	2810.9	9978.2	27023.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.5 m (RADIUS = 8.1 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	1.29	1.27	1.35	1.41	1.47	1.53	1.67	1.74	1.90	2.42	3.17
	10	1.36	1.35	1.44	1.50	1.57	1.64	1.80	1.89	2.07	2.76	4.15
	14	1.49	1.49	1.60	1.68	1.77	1.87	2.08	2.20	2.47	4.02	8.57
100	8	1.52	1.51	1.61	1.68	1.75	1.83	1.99	2.08	2.26	2.87	3.66
	10	1.63	1.62	1.73	1.81	1.89	1.98	2.17	2.27	2.49	3.26	4.52
	14	1.82	1.83	1.97	2.07	2.18	2.29	2.55	2.69	3.00	4.43	8.57
150	8	1.71	1.70	1.81	1.89	1.97	2.06	2.25	2.34	2.55	3.22	4.08
	10	1.85	1.84	1.97	2.06	2.16	2.26	2.47	2.58	2.82	3.68	4.95
	14	2.09	2.10	2.27	2.38	2.51	2.64	2.92	3.08	3.42	4.88	8.61
200	8	1.88	1.87	1.99	2.08	2.17	2.27	2.47	2.58	2.80	3.53	4.45
	10	2.04	2.03	2.18	2.28	2.38	2.49	2.73	2.85	3.12	4.04	5.35
	14	2.33	2.34	2.53	2.65	2.79	2.93	3.25	3.42	3.79	5.31	8.73
250	8	2.03	2.02	2.16	2.25	2.35	2.45	2.67	2.78	3.02	3.81	4.78
	10	2.21	2.21	2.37	2.47	2.59	2.71	2.96	3.10	3.38	4.37	5.72
	14	2.54	2.55	2.76	2.90	3.04	3.20	3.54	3.72	4.12	5.70	8.95
300	8	2.16	2.16	2.30	2.40	2.51	2.62	2.85	2.97	3.23	4.07	5.09
	10	2.36	2.37	2.54	2.65	2.77	2.90	3.17	3.32	3.62	4.66	6.07
	14	2.73	2.75	2.97	3.12	3.28	3.44	3.81	4.00	4.42	6.07	9.21
350	8	2.29	2.29	2.44	2.55	2.66	2.78	3.02	3.15	3.42	4.31	5.37
	10	2.51	2.52	2.70	2.82	2.95	3.08	3.37	3.52	3.84	4.94	6.40
	14	2.91	2.93	3.17	3.33	3.50	3.67	4.06	4.26	4.71	6.41	9.51
400	8	2.41	2.41	2.58	2.68	2.80	2.93	3.19	3.32	3.60	4.53	5.64
	10	2.65	2.66	2.85	2.98	3.11	3.26	3.56	3.72	4.05	5.20	6.71
	14	3.08	3.11	3.36	3.52	3.70	3.89	4.29	4.51	4.97	6.74	9.81
450	8	2.53	2.53	2.70	2.81	2.94	3.07	3.34	3.48	3.77	4.74	5.89
	10	2.78	2.79	2.99	3.13	3.27	3.42	3.74	3.90	4.25	5.45	7.00
	14	3.24	3.27	3.54	3.71	3.90	4.09	4.51	4.74	5.22	7.05	10.12
500	8	2.64	2.64	2.82	2.94	3.07	3.20	3.49	3.63	3.94	4.95	6.14
	10	2.91	2.92	3.13	3.27	3.42	3.58	3.91	4.08	4.45	5.69	7.28
	14	3.40	3.43	3.71	3.89	4.08	4.29	4.73	4.96	5.46	7.35	10.43

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.5 m (RADIUS = 8.1 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	2.74	2.74	2.93	3.06	3.19	3.33	3.63	3.78	4.10	5.14	6.37	
	10	3.03	3.04	3.26	3.41	3.56	3.72	4.07	4.25	4.63	5.92	7.55	
	14	3.55	3.58	3.87	4.06	4.26	4.47	4.93	5.17	5.70	7.63	10.73	
600	8	2.84	2.85	3.04	3.17	3.31	3.46	3.76	3.92	4.25	5.33	6.59	
	10	3.15	3.16	3.39	3.54	3.70	3.87	4.23	4.41	4.81	6.13	7.81	
	14	3.69	3.73	4.03	4.22	4.43	4.65	5.13	5.38	5.92	7.91	11.03	
650	8	2.94	2.95	3.15	3.28	3.43	3.58	3.89	4.06	4.40	5.51	6.81	
	10	3.26	3.27	3.51	3.67	3.83	4.01	4.38	4.57	4.98	6.35	8.06	
	14	3.83	3.87	4.18	4.38	4.60	4.83	5.32	5.58	6.13	8.17	11.32	
700	8	3.04	3.04	3.25	3.39	3.54	3.69	4.02	4.19	4.54	5.68	7.02	
	10	3.37	3.38	3.63	3.79	3.96	4.14	4.52	4.72	5.14	6.55	8.31	
	14	3.97	4.00	4.33	4.54	4.76	5.00	5.50	5.77	6.34	8.43	11.60	
750	8	3.13	3.14	3.35	3.50	3.65	3.81	4.14	4.32	4.68	5.85	7.22	
	10	3.47	3.49	3.75	3.91	4.09	4.27	4.67	4.87	5.30	6.75	8.54	
	14	4.10	4.14	4.47	4.69	4.92	5.16	5.68	5.95	6.54	8.68	11.89	
800	8	3.22	3.23	3.45	3.60	3.75	3.92	4.26	4.44	4.81	6.02	7.42	
	10	3.58	3.59	3.86	4.03	4.21	4.40	4.81	5.02	5.46	6.94	8.77	
	14	4.22	4.27	4.61	4.83	5.07	5.32	5.85	6.13	6.74	8.92	12.16	
850	8	3.31	3.32	3.55	3.70	3.86	4.03	4.38	4.56	4.94	6.18	7.61	
	10	3.68	3.70	3.97	4.14	4.33	4.53	4.94	5.16	5.61	7.13	9.00	
	14	4.35	4.39	4.75	4.97	5.22	5.47	6.02	6.31	6.93	9.16	12.43	
900	8	3.39	3.40	3.64	3.79	3.96	4.13	4.49	4.68	5.07	6.34	7.80	
	10	3.78	3.80	4.08	4.25	4.45	4.65	5.07	5.29	5.76	7.31	9.22	
	14	4.47	4.52	4.88	5.11	5.36	5.62	6.18	6.48	7.11	9.39	12.70	
950	8	3.48	3.49	3.73	3.89	4.06	4.23	4.60	4.80	5.19	6.49	7.98	
	10	3.87	3.89	4.18	4.36	4.56	4.77	5.20	5.43	5.90	7.49	9.43	
	14	4.59	4.64	5.01	5.25	5.50	5.77	6.34	6.65	7.30	9.61	12.96	
1000	8	3.56	3.57	3.82	3.98	4.15	4.33	4.71	4.91	5.32	6.64	8.16	
	10	3.97	3.99	4.28	4.47	4.67	4.88	5.33	5.56	6.04	7.66	9.64	
	14	4.70	4.75	5.14	5.38	5.64	5.92	6.50	6.81	7.47	9.83	13.21	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.5 m (RADIUS = 8.1 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	2.06	2.07	2.26	2.39	2.54	2.70	3.10	3.35	4.02	9.59	23.02
	10	2.23	2.25	2.50	2.68	2.88	3.11	3.77	4.26	5.87	17.07	43.01
	14	2.54	2.62	3.05	3.37	3.80	4.43	6.81	8.61	13.51	43.77	114.47
100	8	2.54	2.56	2.80	2.96	3.14	3.33	3.78	4.05	4.70	9.60	23.02
	10	2.78	2.83	3.14	3.34	3.57	3.84	4.51	4.95	6.22	17.07	43.01
	14	3.23	3.34	3.84	4.19	4.63	5.18	7.05	8.66	13.51	43.77	114.47
150	8	2.93	2.96	3.24	3.42	3.62	3.84	4.33	4.62	5.29	9.70	23.02
	10	3.23	3.29	3.64	3.87	4.13	4.43	5.14	5.58	6.76	17.07	43.01
	14	3.79	3.92	4.48	4.86	5.32	5.88	7.56	8.94	13.52	43.77	114.47
200	8	3.27	3.31	3.61	3.81	4.03	4.27	4.81	5.12	5.83	9.94	23.02
	10	3.62	3.68	4.08	4.33	4.62	4.93	5.69	6.14	7.31	17.07	43.01
	14	4.27	4.42	5.03	5.44	5.92	6.50	8.13	9.37	13.57	43.77	114.47
250	8	3.57	3.62	3.95	4.17	4.41	4.66	5.24	5.56	6.31	10.28	23.02
	10	3.97	4.04	4.47	4.75	5.05	5.39	6.18	6.66	7.84	17.08	43.01
	14	4.71	4.86	5.53	5.96	6.47	7.07	8.69	9.86	13.72	43.77	114.47
300	8	3.85	3.90	4.26	4.49	4.75	5.02	5.63	5.97	6.75	10.67	23.02
	10	4.29	4.37	4.83	5.13	5.45	5.81	6.64	7.13	8.33	17.13	43.01
	14	5.11	5.28	5.98	6.44	6.97	7.59	9.22	10.36	13.97	43.77	114.47
350	8	4.11	4.17	4.55	4.80	5.07	5.36	6.00	6.36	7.16	11.07	23.02
	10	4.59	4.68	5.17	5.48	5.82	6.20	7.07	7.58	8.80	17.23	43.01
	14	5.48	5.66	6.41	6.89	7.44	8.08	9.73	10.85	14.28	43.77	114.47
400	8	4.36	4.42	4.83	5.09	5.37	5.67	6.34	6.72	7.55	11.47	23.04
	10	4.87	4.97	5.49	5.81	6.17	6.57	7.47	7.99	9.24	17.37	43.01
	14	5.84	6.03	6.81	7.31	7.88	8.54	10.22	11.33	14.63	43.77	114.47
450	8	4.59	4.66	5.09	5.36	5.65	5.97	6.67	7.06	7.92	11.88	23.06
	10	5.14	5.25	5.79	6.13	6.51	6.92	7.85	8.39	9.67	17.57	43.01
	14	6.17	6.37	7.19	7.71	8.30	8.98	10.69	11.80	15.01	43.77	114.47
500	8	4.82	4.89	5.33	5.62	5.93	6.26	6.98	7.39	8.28	12.27	23.11
	10	5.40	5.51	6.08	6.43	6.82	7.25	8.22	8.77	10.07	17.80	43.01
	14	6.49	6.70	7.55	8.09	8.70	9.40	11.14	12.25	15.40	43.77	114.47

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.5 m (RADIUS = 8.1 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	5.03	5.10	5.57	5.87	6.19	6.53	7.28	7.70	8.62	12.65	23.18	
	10	5.65	5.76	6.35	6.72	7.13	7.57	8.57	9.14	10.46	18.06	43.01	
	14	6.80	7.01	7.89	8.45	9.09	9.80	11.57	12.69	15.80	43.77	114.47	
600	8	5.24	5.31	5.80	6.11	6.44	6.79	7.57	8.00	8.94	13.03	23.28	
	10	5.89	6.01	6.62	7.00	7.42	7.88	8.90	9.49	10.84	18.35	43.01	
	14	7.09	7.32	8.23	8.80	9.46	10.19	11.99	13.12	16.19	43.77	114.47	
650	8	5.44	5.52	6.02	6.34	6.68	7.05	7.85	8.29	9.26	13.40	23.41	
	10	6.12	6.24	6.87	7.27	7.70	8.17	9.23	9.83	11.21	18.65	43.01	
	14	7.38	7.61	8.55	9.14	9.81	10.56	12.39	13.53	16.59	43.77	114.47	
700	8	5.63	5.72	6.24	6.56	6.91	7.29	8.12	8.57	9.56	13.76	23.56	
	10	6.34	6.47	7.12	7.53	7.97	8.46	9.54	10.15	11.56	18.96	43.01	
	14	7.65	7.89	8.86	9.47	10.16	10.92	12.78	13.93	16.98	43.77	114.47	
750	8	5.82	5.91	6.44	6.78	7.14	7.53	8.38	8.84	9.86	14.11	23.73	
	10	6.56	6.69	7.36	7.78	8.24	8.74	9.85	10.47	11.91	19.28	43.01	
	14	7.92	8.17	9.16	9.79	10.49	11.27	13.16	14.33	17.37	43.78	114.47	
800	8	6.00	6.09	6.65	6.99	7.36	7.76	8.63	9.11	10.15	14.45	23.92	
	10	6.77	6.91	7.60	8.03	8.50	9.01	10.14	10.78	12.24	19.60	43.02	
	14	8.18	8.44	9.46	10.10	10.82	11.62	13.53	14.71	17.75	43.78	114.47	
850	8	6.18	6.28	6.84	7.20	7.58	7.99	8.88	9.37	10.43	14.79	24.13	
	10	6.97	7.11	7.82	8.27	8.75	9.27	10.43	11.08	12.57	19.92	43.02	
	14	8.44	8.70	9.74	10.40	11.13	11.95	13.90	15.08	18.13	43.79	114.47	
900	8	6.36	6.45	7.03	7.40	7.79	8.21	9.12	9.62	10.70	15.12	24.35	
	10	7.17	7.32	8.05	8.50	8.99	9.53	10.71	11.38	12.88	20.24	43.03	
	14	8.69	8.95	10.02	10.69	11.44	12.27	14.25	15.45	18.50	43.80	114.47	
950	8	6.53	6.63	7.22	7.59	8.00	8.42	9.36	9.86	10.97	15.44	24.58	
	10	7.37	7.52	8.26	8.73	9.23	9.78	10.99	11.66	13.19	20.57	43.04	
	14	8.93	9.20	10.30	10.98	11.74	12.59	14.59	15.80	18.87	43.82	114.47	
1000	8	6.69	6.80	7.41	7.79	8.20	8.64	9.59	10.10	11.23	15.76	24.82	
	10	7.56	7.72	8.48	8.95	9.47	10.02	11.26	11.94	13.50	20.89	43.06	
	14	9.17	9.44	10.56	11.26	12.04	12.90	14.93	16.15	19.23	43.84	114.47	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.5 m (RADIUS = 8.1 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	3.62	3.84	4.89	5.94	7.75	10.39	18.10	23.43	37.89	127.75	338.35	
	10	4.08	4.49	6.83	9.63	13.59	18.75	33.69	44.04	72.16	247.30	658.26	
	14	5.10	6.44	15.74	23.80	34.57	48.64	89.41	117.69	194.62	674.56	1801.6	
100	8	4.64	4.90	6.00	6.90	8.27	10.50	18.10	23.43	37.89	127.75	338.35	
	10	5.26	5.72	7.74	9.90	13.60	18.75	33.69	44.04	72.16	247.30	658.26	
	14	6.59	7.80	15.75	23.80	34.57	48.64	89.41	117.69	194.62	674.56	1801.6	
150	8	5.45	5.75	6.92	7.81	9.05	10.94	18.11	23.43	37.89	127.75	338.35	
	10	6.21	6.71	8.71	10.57	13.77	18.76	33.69	44.04	72.16	247.30	658.26	
	14	7.79	9.00	15.89	23.80	34.57	48.64	89.41	117.69	194.62	674.56	1801.6	
200	8	6.16	6.48	7.73	8.63	9.84	11.56	18.15	23.43	37.89	127.75	338.35	
	10	7.03	7.56	9.60	11.35	14.18	18.82	33.69	44.04	72.16	247.30	658.26	
	14	8.82	10.06	16.28	23.81	34.57	48.64	89.41	117.69	194.62	674.56	1801.6	
250	8	6.79	7.14	8.45	9.38	10.59	12.23	18.30	23.45	37.89	127.75	338.35	
	10	7.77	8.33	10.42	12.12	14.73	18.99	33.69	44.04	72.16	247.30	658.26	
	14	9.75	11.02	16.86	23.88	34.57	48.64	89.41	117.69	194.62	674.56	1801.6	
300	8	7.38	7.75	9.12	10.08	11.29	12.90	18.56	23.50	37.89	127.75	338.35	
	10	8.45	9.04	11.19	12.87	15.35	19.29	33.69	44.04	72.16	247.30	658.26	
	14	10.61	11.90	17.52	24.05	34.57	48.64	89.41	117.69	194.62	674.56	1801.6	
350	8	7.92	8.31	9.74	10.73	11.96	13.55	18.91	23.61	37.89	127.75	338.35	
	10	9.08	9.70	11.91	13.59	15.98	19.68	33.70	44.04	72.16	247.30	658.26	
	14	11.40	12.73	18.22	24.32	34.59	48.64	89.41	117.69	194.62	674.56	1801.6	
400	8	8.43	8.84	10.33	11.34	12.59	14.18	19.32	23.78	37.89	127.75	338.35	
	10	9.67	10.31	12.58	14.28	16.62	20.14	33.72	44.04	72.16	247.30	658.26	
	14	12.15	13.51	18.93	24.68	34.62	48.64	89.41	117.69	194.62	674.56	1801.6	
450	8	8.92	9.34	10.89	11.93	13.19	14.78	19.78	24.02	37.90	127.75	338.35	
	10	10.24	10.90	13.23	14.94	17.25	20.64	33.75	44.04	72.16	247.30	658.26	
	14	12.86	14.25	19.64	25.12	34.69	48.64	89.41	117.69	194.62	674.56	1801.6	
500	8	9.38	9.82	11.42	12.49	13.77	15.37	20.26	24.32	37.91	127.75	338.35	
	10	10.78	11.46	13.85	15.57	17.87	21.16	33.81	44.04	72.16	247.30	658.26	
	14	13.54	14.96	20.33	25.60	34.80	48.64	89.41	117.69	194.62	674.56	1801.6	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.5 m (RADIUS = 8.1 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	9.83	10.28	11.93	13.02	14.33	15.94	20.75	24.66	37.93	127.75	338.35	
	10	11.30	12.00	14.44	16.18	18.48	21.69	33.91	44.05	72.16	247.30	658.26	
	14	14.19	15.63	21.01	26.12	34.96	48.65	89.41	117.69	194.62	674.56	1801.6	
600	8	10.26	10.73	12.42	13.54	14.87	16.49	21.25	25.03	37.97	127.75	338.35	
	10	11.79	12.51	15.01	16.77	19.07	22.23	34.04	44.07	72.16	247.30	658.26	
	14	14.82	16.28	21.68	26.65	35.17	48.67	89.41	117.69	194.62	674.56	1801.6	
650	8	10.67	11.15	12.89	14.03	15.39	17.03	21.75	25.42	38.03	127.75	338.35	
	10	12.27	13.01	15.56	17.34	19.64	22.77	34.22	44.09	72.16	247.30	658.26	
	14	15.42	16.91	22.33	27.20	35.43	48.69	89.41	117.69	194.62	674.56	1801.6	
700	8	11.08	11.57	13.35	14.51	15.89	17.55	22.24	25.84	38.11	127.75	338.35	
	10	12.74	13.50	16.09	17.90	20.21	23.30	34.43	44.14	72.16	247.30	658.26	
	14	16.01	17.52	22.97	27.76	35.72	48.73	89.41	117.69	194.62	674.56	1801.6	
750	8	11.47	11.97	13.79	14.98	16.38	18.05	22.74	26.26	38.22	127.75	338.35	
	10	13.19	13.96	16.61	18.44	20.76	23.83	34.67	44.19	72.16	247.30	658.26	
	14	16.57	18.11	23.59	28.32	36.05	48.79	89.41	117.69	194.62	674.56	1801.6	
800	8	11.84	12.36	14.23	15.44	16.86	18.55	23.22	26.69	38.36	127.75	338.35	
	10	13.63	14.42	17.11	18.96	21.29	24.35	34.94	44.27	72.16	247.30	658.26	
	14	17.12	18.69	24.20	28.88	36.41	48.87	89.41	117.69	194.62	674.56	1801.6	
850	8	12.21	12.74	14.65	15.88	17.32	19.03	23.70	27.13	38.52	127.75	338.35	
	10	14.06	14.86	17.60	19.48	21.82	24.87	35.24	44.37	72.16	247.30	658.26	
	14	17.66	19.25	24.79	29.43	36.79	48.98	89.41	117.69	194.62	674.56	1801.6	
900	8	12.57	13.11	15.06	16.31	17.77	19.50	24.18	27.57	38.70	127.75	338.35	
	10	14.48	15.29	18.08	19.98	22.33	25.38	35.56	44.49	72.16	247.30	658.26	
	14	18.19	19.79	25.38	29.99	37.19	49.10	89.41	117.69	194.62	674.56	1801.6	
950	8	12.93	13.48	15.46	16.73	18.22	19.96	24.65	28.00	38.91	127.75	338.35	
	10	14.88	15.72	18.55	20.47	22.84	25.88	35.89	44.64	72.16	247.30	658.26	
	14	18.70	20.33	25.95	30.54	37.61	49.25	89.41	117.69	194.62	674.56	1801.6	
1000	8	13.27	13.83	15.85	17.15	18.65	20.41	25.11	28.44	39.14	127.75	338.35	
	10	15.28	16.13	19.01	20.95	23.33	26.37	36.24	44.81	72.16	247.30	658.26	
	14	19.20	20.85	26.51	31.08	38.04	49.43	89.41	117.69	194.62	674.56	1801.6	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.5 m (RADIUS = 8.1 m)₃
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50 (m*s) ^{1/2}	8	8.38	14.98	44.57	68.54	100.60	142.50	264.02	348.33	577.80	2010.0	5374.0	
	10	12.04	27.50	85.22	131.97	194.52	276.29	513.48	678.07	1126.1	3922.8	10493.	
	14	28.89	72.25	230.50	358.66	530.17	754.42	1405.0	1856.4	3085.5	10759.	28786.	
100	8	10.44	15.38	44.57	68.54	100.60	142.50	264.02	348.33	577.80	2010.0	5374.0	
	10	13.74	27.50	85.22	131.97	194.52	276.29	513.48	678.07	1126.1	3922.8	10493.	
	14	28.90	72.25	230.50	358.66	530.17	754.42	1405.0	1856.4	3085.5	10759.	28786.	
150	8	12.17	16.41	44.57	68.54	100.60	142.50	264.02	348.33	577.80	2010.0	5374.0	
	10	15.55	27.56	85.22	131.97	194.52	276.29	513.48	678.07	1126.1	3922.8	10493.	
	14	29.16	72.25	230.50	358.66	530.17	754.42	1405.0	1856.4	3085.5	10759.	28786.	
200	8	13.68	17.63	44.57	68.54	100.60	142.50	264.02	348.33	577.80	2010.0	5374.0	
	10	17.22	27.82	85.22	131.97	194.52	276.29	513.48	678.07	1126.1	3922.8	10493.	
	14	29.87	72.25	230.50	358.66	530.17	754.42	1405.0	1856.4	3085.5	10759.	28786.	
250	8	15.05	18.85	44.57	68.54	100.60	142.50	264.02	348.33	577.80	2010.0	5374.0	
	10	18.76	28.36	85.22	131.97	194.52	276.29	513.48	678.07	1126.1	3922.8	10493.	
	14	30.93	72.25	230.50	358.66	530.17	754.42	1405.0	1856.4	3085.5	10759.	28786.	
300	8	16.30	20.03	44.58	68.54	100.60	142.50	264.02	348.33	577.80	2010.0	5374.0	
	10	20.20	29.12	85.22	131.97	194.52	276.29	513.48	678.07	1126.1	3922.8	10493.	
	14	32.17	72.26	230.50	358.66	530.17	754.42	1405.0	1856.4	3085.5	10759.	28786.	
350	8	17.47	21.17	44.60	68.54	100.60	142.50	264.02	348.33	577.80	2010.0	5374.0	
	10	21.54	30.00	85.22	131.97	194.52	276.29	513.48	678.07	1126.1	3922.8	10493.	
	14	33.47	72.26	230.50	358.66	530.17	754.42	1405.0	1856.4	3085.5	10759.	28786.	
400	8	18.57	22.26	44.67	68.54	100.60	142.50	264.02	348.33	577.80	2010.0	5374.0	
	10	22.81	30.94	85.22	131.97	194.52	276.29	513.48	678.07	1126.1	3922.8	10493.	
	14	34.80	72.26	230.50	358.66	530.17	754.42	1405.0	1856.4	3085.5	10759.	28786.	
450	8	19.62	23.31	44.79	68.54	100.60	142.50	264.02	348.33	577.80	2010.0	5374.0	
	10	24.02	31.92	85.22	131.97	194.52	276.29	513.48	678.07	1126.1	3922.8	10493.	
	14	36.11	72.28	230.50	358.66	530.17	754.42	1405.0	1856.4	3085.5	10759.	28786.	
500	8	20.62	24.31	44.97	68.54	100.60	142.50	264.02	348.33	577.80	2010.0	5374.0	
	10	25.18	32.91	85.22	131.97	194.52	276.29	513.48	678.07	1126.1	3922.8	10493.	
	14	37.41	72.31	230.50	358.66	530.17	754.42	1405.0	1856.4	3085.5	10759.	28786.	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 11.5 m (RADIUS = 8.1 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
		(m*s) ^{1/2}	°C/min										
550	8	21.57	25.29	45.22	68.54	100.60	142.50	264.02	348.33	577.80	2010.0	5374.0	
	10	26.29	33.89	85.22	131.97	194.52	276.29	513.48	678.07	1126.1	3922.8	10493.	
	14	38.68	72.37	230.50	358.66	530.17	754.42	1405.0	1856.4	3085.5	10759.	28786.	
600	8	22.49	26.22	45.54	68.55	100.60	142.50	264.02	348.33	577.80	2010.0	5374.0	
	10	27.36	34.86	85.22	131.97	194.52	276.29	513.48	678.07	1126.1	3922.8	10493.	
	14	39.93	72.46	230.50	358.66	530.17	754.42	1405.0	1856.4	3085.5	10759.	28786.	
650	8	23.38	27.13	45.92	68.57	100.60	142.50	264.02	348.33	577.80	2010.0	5374.0	
	10	28.39	35.82	85.22	131.97	194.52	276.29	513.48	678.07	1126.1	3922.8	10493.	
	14	41.15	72.60	230.50	358.66	530.17	754.42	1405.0	1856.4	3085.5	10759.	28786.	
700	8	24.24	28.02	46.35	68.60	100.60	142.50	264.02	348.33	577.80	2010.0	5374.0	
	10	29.39	36.77	85.23	131.97	194.52	276.29	513.48	678.07	1126.1	3922.8	10493.	
	14	42.34	72.79	230.50	358.66	530.17	754.42	1405.0	1856.4	3085.5	10759.	28786.	
750	8	25.07	28.88	46.83	68.64	100.60	142.50	264.02	348.33	577.80	2010.0	5374.0	
	10	30.37	37.70	85.24	131.97	194.52	276.29	513.48	678.07	1126.1	3922.8	10493.	
	14	43.51	73.03	230.50	358.66	530.17	754.42	1405.0	1856.4	3085.5	10759.	28786.	
800	8	25.88	29.71	47.34	68.71	100.60	142.50	264.02	348.33	577.80	2010.0	5374.0	
	10	31.31	38.62	85.26	131.97	194.52	276.29	513.48	678.07	1126.1	3922.8	10493.	
	14	44.65	73.33	230.50	358.66	530.17	754.42	1405.0	1856.4	3085.5	10759.	28786.	
850	8	26.67	30.53	47.88	68.79	100.60	142.50	264.02	348.33	577.80	2010.0	5374.0	
	10	32.23	39.52	85.29	131.97	194.52	276.29	513.48	678.07	1126.1	3922.8	10493.	
	14	45.77	73.68	230.50	358.66	530.17	754.42	1405.0	1856.4	3085.5	10759.	28786.	
900	8	27.44	31.32	48.44	68.90	100.60	142.50	264.02	348.33	577.80	2010.0	5374.0	
	10	33.13	40.40	85.33	131.97	194.52	276.29	513.48	678.07	1126.1	3922.8	10493.	
	14	46.87	74.08	230.50	358.66	530.17	754.42	1405.0	1856.4	3085.5	10759.	28786.	
950	8	28.19	32.10	49.02	69.04	100.60	142.50	264.02	348.33	577.80	2010.0	5374.0	
	10	34.00	41.27	85.38	131.97	194.52	276.29	513.48	678.07	1126.1	3922.8	10493.	
	14	47.94	74.53	230.50	358.66	530.17	754.42	1405.0	1856.4	3085.5	10759.	28786.	
1000	8	28.93	32.87	49.61	69.20	100.61	142.50	264.02	348.33	577.80	2010.0	5374.0	
	10	34.86	42.12	85.45	131.97	194.52	276.29	513.48	678.07	1126.1	3922.8	10493.	
	14	48.99	75.01	230.50	358.66	530.17	754.42	1405.0	1856.4	3085.5	10759.	28786.	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 m (RADIUS = 8.5 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		(m*s) ^{1/2}											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	1.35	1.32	1.40	1.45	1.52	1.58	1.72	1.79	1.94	2.48	3.25	
	10	1.42	1.40	1.49	1.55	1.62	1.70	1.86	1.94	2.12	2.84	4.32	
	14	1.56	1.55	1.66	1.75	1.83	1.93	2.15	2.27	2.55	4.22	9.04	
100	8	1.59	1.57	1.67	1.73	1.81	1.88	2.05	2.14	2.32	2.94	3.75	
	10	1.70	1.69	1.80	1.88	1.96	2.05	2.24	2.34	2.56	3.36	4.67	
	14	1.91	1.91	2.05	2.15	2.26	2.38	2.63	2.78	3.10	4.61	9.04	
150	8	1.79	1.77	1.88	1.96	2.04	2.13	2.32	2.41	2.62	3.30	4.18	
	10	1.93	1.92	2.05	2.14	2.23	2.33	2.55	2.66	2.91	3.78	5.10	
	14	2.19	2.19	2.36	2.47	2.60	2.73	3.02	3.18	3.53	5.06	9.06	
200	8	1.96	1.95	2.07	2.15	2.24	2.34	2.55	2.65	2.88	3.62	4.56	
	10	2.13	2.12	2.26	2.36	2.47	2.58	2.82	2.94	3.21	4.15	5.51	
	14	2.43	2.44	2.63	2.76	2.89	3.04	3.36	3.53	3.91	5.50	9.17	
250	8	2.12	2.11	2.24	2.33	2.43	2.53	2.75	2.87	3.11	3.91	4.90	
	10	2.31	2.30	2.46	2.56	2.68	2.80	3.06	3.19	3.48	4.49	5.89	
	14	2.66	2.67	2.87	3.01	3.16	3.32	3.66	3.85	4.26	5.90	9.36	
300	8	2.26	2.25	2.39	2.49	2.60	2.71	2.94	3.07	3.32	4.17	5.21	
	10	2.47	2.47	2.64	2.75	2.87	3.00	3.28	3.42	3.73	4.79	6.24	
	14	2.86	2.87	3.10	3.24	3.40	3.57	3.94	4.14	4.57	6.27	9.61	
350	8	2.40	2.39	2.54	2.64	2.75	2.87	3.12	3.25	3.52	4.42	5.50	
	10	2.63	2.63	2.81	2.93	3.06	3.19	3.48	3.64	3.96	5.08	6.58	
	14	3.05	3.07	3.30	3.46	3.63	3.81	4.20	4.41	4.86	6.63	9.90	
400	8	2.52	2.51	2.68	2.78	2.90	3.03	3.29	3.42	3.71	4.65	5.78	
	10	2.77	2.77	2.96	3.09	3.23	3.37	3.68	3.84	4.18	5.35	6.89	
	14	3.23	3.25	3.50	3.66	3.84	4.03	4.44	4.66	5.14	6.96	10.20	
450	8	2.64	2.64	2.81	2.92	3.04	3.17	3.45	3.59	3.89	4.87	6.04	
	10	2.91	2.91	3.11	3.25	3.39	3.54	3.86	4.03	4.39	5.61	7.19	
	14	3.40	3.42	3.69	3.86	4.05	4.24	4.67	4.90	5.40	7.28	10.50	
500	8	2.76	2.75	2.93	3.05	3.18	3.31	3.60	3.75	4.06	5.08	6.29	
	10	3.04	3.05	3.26	3.40	3.54	3.70	4.04	4.21	4.58	5.85	7.48	
	14	3.56	3.59	3.86	4.04	4.24	4.45	4.89	5.13	5.65	7.59	10.81	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 m (RADIUS = 8.5 m)
FIRE GROWTH: ULTRAFAST ($\alpha = .1875 \text{ kJ/s}^3$)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		(m*s) ^{1/2}											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	2.87	2.86	3.05	3.17	3.31	3.45	3.74	3.90	4.22	5.28	6.53	
	10	3.17	3.17	3.39	3.54	3.69	3.86	4.21	4.39	4.77	6.08	7.76	
	14	3.72	3.74	4.04	4.22	4.43	4.64	5.11	5.35	5.89	7.88	11.12	
600	8	2.98	2.97	3.17	3.29	3.43	3.58	3.88	4.04	4.38	5.47	6.76	
	10	3.29	3.30	3.53	3.68	3.84	4.01	4.37	4.56	4.96	6.31	8.02	
	14	3.87	3.90	4.20	4.39	4.60	4.83	5.31	5.57	6.12	8.16	11.42	
650	8	3.08	3.08	3.28	3.41	3.55	3.70	4.02	4.19	4.53	5.66	6.98	
	10	3.41	3.42	3.65	3.81	3.98	4.15	4.53	4.72	5.13	6.52	8.28	
	14	4.02	4.04	4.36	4.56	4.78	5.01	5.50	5.77	6.34	8.43	11.71	
700	8	3.18	3.18	3.38	3.52	3.67	3.82	4.15	4.32	4.67	5.84	7.19	
	10	3.53	3.53	3.78	3.94	4.11	4.29	4.68	4.88	5.30	6.73	8.53	
	14	4.16	4.19	4.51	4.72	4.95	5.18	5.70	5.97	6.55	8.70	12.00	
750	8	3.28	3.27	3.49	3.63	3.78	3.94	4.28	4.45	4.82	6.01	7.40	
	10	3.64	3.65	3.90	4.06	4.24	4.43	4.83	5.03	5.47	6.94	8.78	
	14	4.29	4.33	4.66	4.88	5.11	5.35	5.88	6.16	6.76	8.95	12.29	
800	8	3.37	3.37	3.59	3.74	3.89	4.06	4.40	4.58	4.96	6.18	7.61	
	10	3.75	3.76	4.02	4.19	4.37	4.56	4.97	5.18	5.63	7.14	9.01	
	14	4.43	4.46	4.81	5.03	5.27	5.52	6.06	6.35	6.96	9.20	12.57	
850	8	3.46	3.46	3.69	3.84	4.00	4.17	4.52	4.71	5.09	6.35	7.80	
	10	3.85	3.86	4.13	4.31	4.49	4.69	5.11	5.33	5.78	7.33	9.24	
	14	4.56	4.59	4.95	5.18	5.42	5.68	6.23	6.53	7.16	9.45	12.84	
900	8	3.55	3.55	3.79	3.94	4.10	4.28	4.64	4.83	5.22	6.51	8.00	
	10	3.96	3.97	4.24	4.42	4.61	4.82	5.24	5.47	5.94	7.52	9.47	
	14	4.69	4.72	5.09	5.32	5.57	5.84	6.40	6.71	7.35	9.68	13.11	
950	8	3.64	3.64	3.88	4.04	4.21	4.38	4.76	4.95	5.35	6.66	8.18	
	10	4.06	4.07	4.35	4.53	4.73	4.94	5.38	5.61	6.09	7.70	9.68	
	14	4.81	4.85	5.22	5.46	5.72	5.99	6.57	6.88	7.54	9.92	13.38	
1000	8	3.73	3.73	3.97	4.14	4.31	4.49	4.87	5.07	5.48	6.82	8.37	
	10	4.16	4.17	4.46	4.65	4.85	5.06	5.51	5.74	6.23	7.88	9.90	
	14	4.93	4.97	5.35	5.60	5.86	6.14	6.73	7.05	7.72	10.14	13.64	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 m (RADIUS = 8.5 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	2.16	2.16	2.35	2.49	2.64	2.81	3.22	3.49	4.22	10.22	24.38	
	10	2.33	2.35	2.61	2.79	3.00	3.25	3.97	4.51	6.31	18.27	45.66	
	14	2.66	2.75	3.20	3.55	4.03	4.75	7.43	9.39	14.68	47.02	121.71	
100	8	2.66	2.68	2.92	3.08	3.26	3.46	3.93	4.21	4.90	10.22	24.38	
	10	2.91	2.96	3.27	3.48	3.73	4.01	4.72	5.19	6.60	18.27	45.66	
	14	3.39	3.50	4.03	4.40	4.87	5.49	7.60	9.42	14.68	47.02	121.71	
150	8	3.07	3.09	3.37	3.56	3.76	3.98	4.50	4.80	5.51	10.29	24.38	
	10	3.38	3.44	3.80	4.04	4.31	4.61	5.36	5.83	7.12	18.27	45.66	
	14	3.98	4.11	4.70	5.10	5.59	6.19	8.07	9.63	14.69	47.02	121.71	
200	8	3.42	3.46	3.77	3.97	4.19	4.44	4.99	5.31	6.05	10.50	24.38	
	10	3.79	3.86	4.26	4.52	4.81	5.14	5.93	6.41	7.67	18.27	45.66	
	14	4.49	4.63	5.27	5.70	6.22	6.84	8.62	10.01	14.72	47.02	121.71	
250	8	3.74	3.78	4.12	4.34	4.58	4.84	5.44	5.77	6.55	10.81	24.39	
	10	4.16	4.23	4.67	4.95	5.27	5.62	6.45	6.94	8.20	18.28	45.66	
	14	4.94	5.10	5.79	6.25	6.78	7.42	9.18	10.48	14.83	47.02	121.71	
300	8	4.04	4.08	4.44	4.68	4.94	5.22	5.85	6.20	7.00	11.18	24.39	
	10	4.50	4.58	5.05	5.35	5.68	6.05	6.92	7.43	8.70	18.31	45.66	
	14	5.37	5.54	6.27	6.75	7.31	7.96	9.72	10.97	15.02	47.02	121.71	
350	8	4.31	4.36	4.75	5.00	5.27	5.57	6.23	6.60	7.43	11.58	24.39	
	10	4.82	4.90	5.40	5.72	6.07	6.46	7.36	7.89	9.18	18.38	45.66	
	14	5.76	5.94	6.71	7.22	7.80	8.47	10.24	11.47	15.29	47.02	121.71	
400	8	4.57	4.62	5.03	5.30	5.58	5.89	6.58	6.97	7.84	11.98	24.40	
	10	5.11	5.21	5.73	6.06	6.44	6.84	7.78	8.33	9.64	18.49	45.66	
	14	6.13	6.32	7.13	7.65	8.26	8.95	10.74	11.95	15.61	47.02	121.71	
450	8	4.82	4.87	5.30	5.58	5.88	6.20	6.92	7.32	8.22	12.38	24.42	
	10	5.40	5.49	6.04	6.39	6.78	7.20	8.18	8.74	10.08	18.66	45.66	
	14	6.48	6.68	7.53	8.07	8.69	9.41	11.22	12.43	15.97	47.02	121.71	
500	8	5.05	5.11	5.56	5.85	6.16	6.50	7.25	7.66	8.58	12.78	24.45	
	10	5.67	5.77	6.34	6.71	7.11	7.55	8.55	9.13	10.50	18.86	45.66	
	14	6.82	7.03	7.90	8.47	9.11	9.84	11.69	12.89	16.34	47.02	121.71	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 m (RADIUS = 8.5 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	5.28	5.34	5.81	6.11	6.43	6.79	7.56	7.98	8.93	13.17	24.51	
	10	5.93	6.04	6.63	7.01	7.43	7.88	8.92	9.51	10.90	19.10	45.66	
	14	7.14	7.36	8.27	8.85	9.51	10.26	12.13	13.34	16.73	47.02	121.71	
600	8	5.49	5.56	6.05	6.36	6.70	7.06	7.86	8.30	9.27	13.55	24.59	
	10	6.18	6.29	6.91	7.30	7.73	8.20	9.26	9.87	11.29	19.36	45.66	
	14	7.45	7.68	8.62	9.21	9.89	10.66	12.56	13.77	17.12	47.02	121.71	
650	8	5.70	5.78	6.28	6.60	6.95	7.32	8.15	8.60	9.60	13.92	24.69	
	10	6.42	6.54	7.18	7.58	8.03	8.51	9.60	10.22	11.66	19.65	45.66	
	14	7.75	7.98	8.95	9.57	10.26	11.05	12.98	14.20	17.52	47.02	121.71	
700	8	5.91	5.98	6.50	6.83	7.19	7.58	8.42	8.89	9.91	14.29	24.82	
	10	6.65	6.78	7.44	7.85	8.31	8.81	9.93	10.56	12.03	19.95	45.67	
	14	8.04	8.28	9.28	9.91	10.62	11.43	13.38	14.61	17.91	47.02	121.71	
750	8	6.10	6.18	6.72	7.06	7.43	7.83	8.70	9.17	10.22	14.65	24.97	
	10	6.88	7.01	7.69	8.12	8.59	9.10	10.24	10.89	12.38	20.26	45.67	
	14	8.32	8.57	9.59	10.24	10.97	11.79	13.78	15.02	18.30	47.02	121.71	
800	8	6.30	6.38	6.93	7.28	7.66	8.07	8.96	9.45	10.52	15.00	25.14	
	10	7.10	7.23	7.93	8.37	8.85	9.38	10.55	11.21	12.73	20.57	45.67	
	14	8.60	8.85	9.90	10.56	11.31	12.14	14.16	15.41	18.69	47.02	121.71	
850	8	6.48	6.57	7.14	7.50	7.89	8.30	9.21	9.71	10.81	15.34	25.33	
	10	7.32	7.45	8.17	8.62	9.12	9.65	10.85	11.52	13.07	20.89	45.67	
	14	8.87	9.12	10.20	10.88	11.64	12.49	14.54	15.79	19.07	47.03	121.71	
900	8	6.67	6.75	7.34	7.71	8.10	8.53	9.46	9.97	11.09	15.68	25.54	
	10	7.53	7.67	8.40	8.87	9.37	9.92	11.14	11.83	13.39	21.21	45.68	
	14	9.13	9.39	10.49	11.18	11.96	12.83	14.90	16.17	19.45	47.04	121.71	
950	8	6.85	6.94	7.53	7.91	8.32	8.76	9.71	10.23	11.37	16.01	25.76	
	10	7.74	7.88	8.63	9.10	9.62	10.18	11.43	12.12	13.71	21.53	45.68	
	14	9.38	9.65	10.78	11.48	12.27	13.16	15.26	16.54	19.82	47.04	121.71	
1000	8	7.02	7.11	7.73	8.11	8.53	8.97	9.95	10.48	11.64	16.33	25.99	
	10	7.94	8.08	8.85	9.34	9.86	10.43	11.70	12.42	14.03	21.85	45.69	
	14	9.63	9.91	11.06	11.78	12.58	13.48	15.61	16.90	20.19	47.06	121.71	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 m (RADIUS = 8.5 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	3.81	4.05	5.23	6.46	8.55	11.48	19.91	25.71	41.35	137.41	359.93	
	10	4.30	4.77	7.54	10.75	15.14	20.84	37.20	48.46	78.89	266.14	700.40	
	14	5.43	7.05	17.80	26.80	38.77	54.30	98.97	129.75	213.05	726.20	1917.2	
100	8	4.88	5.16	6.35	7.36	8.95	11.54	19.91	25.71	41.35	137.41	359.93	
	10	5.55	6.05	8.35	10.92	15.15	20.84	37.20	48.46	78.89	266.14	700.40	
	14	6.99	8.40	17.80	26.80	38.77	54.30	98.97	129.75	213.05	726.20	1917.2	
150	8	5.74	6.05	7.31	8.29	9.69	11.88	19.92	25.71	41.35	137.41	359.93	
	10	6.55	7.09	9.32	11.49	15.25	20.84	37.20	48.46	78.89	266.14	700.40	
	14	8.25	9.63	17.87	26.81	38.77	54.30	98.97	129.75	213.05	726.20	1917.2	
200	8	6.48	6.82	8.15	9.13	10.48	12.44	19.94	25.71	41.35	137.41	359.93	
	10	7.41	7.99	10.23	12.23	15.55	20.87	37.20	48.46	78.89	266.14	700.40	
	14	9.34	10.73	18.13	26.81	38.77	54.30	98.97	129.75	213.05	726.20	1917.2	
250	8	7.15	7.51	8.91	9.91	11.24	13.09	20.03	25.72	41.35	137.41	359.93	
	10	8.19	8.79	11.08	13.00	16.02	20.98	37.20	48.46	78.89	266.14	700.40	
	14	10.33	11.74	18.60	26.84	38.77	54.30	98.97	129.75	213.05	726.20	1917.2	
300	8	7.76	8.15	9.61	10.63	11.96	13.75	20.22	25.74	41.35	137.41	359.93	
	10	8.90	9.54	11.87	13.75	16.59	21.19	37.20	48.46	78.89	266.14	700.40	
	14	11.23	12.66	19.19	26.93	38.77	54.30	98.97	129.75	213.05	726.20	1917.2	
350	8	8.33	8.74	10.26	11.31	12.64	14.40	20.50	25.81	41.35	137.41	359.93	
	10	9.57	10.23	12.62	14.48	17.21	21.50	37.20	48.46	78.89	266.14	700.40	
	14	12.06	13.53	19.85	27.11	38.77	54.30	98.97	129.75	213.05	726.20	1917.2	
400	8	8.87	9.30	10.87	11.95	13.30	15.04	20.86	25.93	41.35	137.41	359.93	
	10	10.19	10.88	13.32	15.19	17.83	21.90	37.21	48.46	78.89	266.14	700.40	
	14	12.85	14.35	20.53	27.37	38.79	54.30	98.97	129.75	213.05	726.20	1917.2	
450	8	9.38	9.82	11.45	12.56	13.92	15.66	21.28	26.11	41.36	137.41	359.93	
	10	10.79	11.49	14.00	15.87	18.46	22.35	37.23	48.46	78.89	266.14	700.40	
	14	13.60	15.12	21.23	27.72	38.82	54.30	98.97	129.75	213.05	726.20	1917.2	
500	8	9.87	10.33	12.01	13.14	14.52	16.26	21.73	26.35	41.36	137.41	359.93	
	10	11.36	12.08	14.64	16.52	19.09	22.84	37.26	48.46	78.89	266.14	700.40	
	14	14.32	15.86	21.92	28.13	38.88	54.30	98.97	129.75	213.05	726.20	1917.2	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 m (RADIUS = 8.5 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	10.34	10.81	12.54	13.70	15.10	16.85	22.20	26.64	41.37	137.41	359.93
	10	11.90	12.64	15.26	17.15	19.70	23.35	37.32	48.46	78.89	266.14	700.40
	14	15.00	16.57	22.61	28.59	38.98	54.31	98.97	129.75	213.05	726.20	1917.2
600	8	10.79	11.28	13.05	14.23	15.66	17.41	22.68	26.97	41.40	137.41	359.93
	10	12.42	13.19	15.85	17.77	20.30	23.87	37.40	48.47	78.89	266.14	700.40
	14	15.66	17.26	23.28	29.08	39.11	54.31	98.97	129.75	213.05	726.20	1917.2
650	8	11.23	11.73	13.55	14.75	16.20	17.97	23.17	27.33	41.43	137.41	359.93
	10	12.93	13.71	16.43	18.36	20.89	24.40	37.52	48.48	78.89	266.14	700.40
	14	16.29	17.92	23.95	29.60	39.29	54.32	98.97	129.75	213.05	726.20	1917.2
700	8	11.65	12.16	14.03	15.26	16.72	18.50	23.66	27.71	41.49	137.41	359.93
	10	13.42	14.22	16.98	18.93	21.46	24.93	37.67	48.51	78.89	266.14	700.40
	14	16.91	18.56	24.60	30.13	39.51	54.34	98.97	129.75	213.05	726.20	1917.2
750	8	12.06	12.58	14.49	15.74	17.23	19.03	24.16	28.11	41.56	137.41	359.93
	10	13.89	14.71	17.52	19.50	22.03	25.45	37.86	48.54	78.89	266.14	700.40
	14	17.51	19.18	25.24	30.67	39.77	54.37	98.97	129.75	213.05	726.20	1917.2
800	8	12.46	12.99	14.94	16.22	17.73	19.54	24.64	28.52	41.65	137.41	359.93
	10	14.36	15.19	18.05	20.04	22.58	25.98	38.08	48.59	78.89	266.14	700.40
	14	18.09	19.78	25.86	31.21	40.06	54.42	98.97	129.75	213.05	726.20	1917.2
850	8	12.85	13.39	15.38	16.68	18.21	20.03	25.13	28.94	41.77	137.41	359.93
	10	14.81	15.65	18.56	20.57	23.12	26.50	38.32	48.65	78.89	266.14	700.40
	14	18.65	20.37	26.48	31.76	40.38	54.47	98.97	129.75	213.05	726.20	1917.2
900	8	13.23	13.78	15.81	17.13	18.68	20.52	25.61	29.37	41.91	137.41	359.93
	10	15.25	16.11	19.06	21.10	23.66	27.02	38.59	48.73	78.89	266.14	700.40
	14	19.21	20.94	27.08	32.31	40.73	54.55	98.97	129.75	213.05	726.20	1917.2
950	8	13.60	14.16	16.23	17.57	19.14	21.00	26.09	29.80	42.08	137.41	359.93
	10	15.68	16.55	19.55	21.60	24.18	27.53	38.89	48.83	78.89	266.14	700.40
	14	19.74	21.50	27.67	32.86	41.10	54.65	98.97	129.75	213.05	726.20	1917.2
1000	8	13.96	14.54	16.64	18.00	19.59	21.47	26.56	30.23	42.26	137.41	359.93
	10	16.10	16.98	20.03	22.10	24.69	28.03	39.20	48.95	78.89	266.14	700.40
	14	20.27	22.05	28.26	33.41	41.48	54.76	98.97	129.75	213.05	726.20	1917.2

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 m (RADIUS = 8.5 m)
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE
 TIME INDEX

RATE
 OF RISE

(m*s)^{1/2}

CEILING HEIGHT, m

	1	2	4	5	6	7	9	10	12	18	24
50	9.11 13.66 33.60	17.15 31.68 83.61	50.64 97.03 262.82	77.45 149.33 406.22	113.07 218.83 596.79	159.35 309.15 844.49	292.50 569.05 1557.4	384.30 748.27 2049.0	632.74 1233.4 3379.8	2164.1 4223.8 11585.	5718.9 11166. 30634.
100	11.22 15.12 33.61	17.37 31.68 83.61	50.64 97.03 262.82	77.45 149.33 406.22	113.07 218.83 596.79	159.35 309.15 844.49	292.50 569.05 1557.4	384.30 748.27 2049.0	632.74 1233.4 3379.8	2164.1 4223.8 11585.	5718.9 11166. 30634.
150	13.03 16.91 33.71	18.19 31.70 83.61	50.64 97.03 262.82	77.45 149.33 406.22	113.07 218.83 596.79	159.35 309.15 844.49	292.50 569.05 1557.4	384.30 748.27 2049.0	632.74 1233.4 3379.8	2164.1 4223.8 11585.	5718.9 11166. 30634.
200	14.61 18.62 34.13	19.32 31.82 83.61	50.64 97.03 262.82	77.45 149.33 406.22	113.07 218.83 596.79	159.35 309.15 844.49	292.50 569.05 1557.4	384.30 748.27 2049.0	632.74 1233.4 3379.8	2164.1 4223.8 11585.	5718.9 11166. 30634.
250	16.04 20.22 34.93	20.52 32.16 83.61	50.64 97.03 262.82	77.45 149.33 406.22	113.07 218.83 596.79	159.35 309.15 844.49	292.50 569.05 1557.4	384.30 748.27 2049.0	632.74 1233.4 3379.8	2164.1 4223.8 11585.	5718.9 11166. 30634.
300	17.36 21.71 35.98	21.71 32.72 83.61	50.64 97.03 262.82	77.45 149.33 406.22	113.07 218.83 596.79	159.35 309.15 844.49	292.50 569.05 1557.4	384.30 748.27 2049.0	632.74 1233.4 3379.8	2164.1 4223.8 11585.	5718.9 11166. 30634.
350	18.59 23.12 37.18	22.87 33.45 83.61	50.65 97.03 262.82	77.45 149.33 406.22	113.07 218.83 596.79	159.35 309.15 844.49	292.50 569.05 1557.4	384.30 748.27 2049.0	632.74 1233.4 3379.8	2164.1 4223.8 11585.	5718.9 11166. 30634.
400	19.75 24.45 38.44	23.99 34.30 83.61	50.68 97.03 262.82	77.45 149.33 406.22	113.07 218.83 596.79	159.35 309.15 844.49	292.50 569.05 1557.4	384.30 748.27 2049.0	632.74 1233.4 3379.8	2164.1 4223.8 11585.	5718.9 11166. 30634.
450	20.85 25.72 39.72	25.07 35.20 83.61	50.73 97.03 262.82	77.45 149.33 406.22	113.07 218.83 596.79	159.35 309.15 844.49	292.50 569.05 1557.4	384.30 748.27 2049.0	632.74 1233.4 3379.8	2164.1 4223.8 11585.	5718.9 11166. 30634.
500	21.90 26.93 41.01	26.11 36.14 83.62	50.83 97.03 262.82	77.45 149.33 406.22	113.07 218.83 596.79	159.35 309.15 844.49	292.50 569.05 1557.4	384.30 748.27 2049.0	632.74 1233.4 3379.8	2164.1 4223.8 11585.	5718.9 11166. 30634.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 m (RADIUS = 8.5 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE (m*s) ^{1/2}	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	22.91	27.12	50.98	77.45	113.07	159.35	292.50	384.30	632.74	2164.1	5718.9
	10	28.10	37.10	97.03	149.33	218.83	309.15	569.05	748.27	1233.4	4223.8	11166.
	14	42.29	83.64	262.82	406.22	596.79	844.49	1557.4	2049.0	3379.8	11585.	30634.
600	8	23.88	28.10	51.18	77.46	113.07	159.35	292.50	384.30	632.74	2164.1	5718.9
	10	29.22	38.06	97.03	149.33	218.83	309.15	569.05	748.27	1233.4	4223.8	11166.
	14	43.55	83.68	262.82	406.22	596.79	844.49	1557.4	2049.0	3379.8	11585.	30634.
650	8	24.81	29.04	51.45	77.46	113.07	159.35	292.50	384.30	632.74	2164.1	5718.9
	10	30.31	39.02	97.03	149.33	218.83	309.15	569.05	748.27	1233.4	4223.8	11166.
	14	44.79	83.73	262.82	406.22	596.79	844.49	1557.4	2049.0	3379.8	11585.	30634.
700	8	25.72	29.96	51.77	77.47	113.07	159.35	292.50	384.30	632.74	2164.1	5718.9
	10	31.36	39.98	97.04	149.33	218.83	309.15	569.05	748.27	1233.4	4223.8	11166.
	14	46.02	83.82	262.82	406.22	596.79	844.49	1557.4	2049.0	3379.8	11585.	30634.
750	8	26.60	30.86	52.14	77.49	113.07	159.35	292.50	384.30	632.74	2164.1	5718.9
	10	32.38	40.92	97.04	149.33	218.83	309.15	569.05	748.27	1233.4	4223.8	11166.
	14	47.22	83.94	262.82	406.22	596.79	844.49	1557.4	2049.0	3379.8	11585.	30634.
800	8	27.45	31.73	52.55	77.52	113.07	159.35	292.50	384.30	632.74	2164.1	5718.9
	10	33.38	41.85	97.04	149.33	218.83	309.15	569.05	748.27	1233.4	4223.8	11166.
	14	48.39	84.11	262.82	406.22	596.79	844.49	1557.4	2049.0	3379.8	11585.	30634.
850	8	28.28	32.59	53.01	77.56	113.07	159.35	292.50	384.30	632.74	2164.1	5718.9
	10	34.35	42.77	97.05	149.33	218.83	309.15	569.05	748.27	1233.4	4223.8	11166.
	14	49.55	84.31	262.82	406.22	596.79	844.49	1557.4	2049.0	3379.8	11585.	30634.
900	8	29.09	33.42	53.49	77.61	113.07	159.35	292.50	384.30	632.74	2164.1	5718.9
	10	35.29	43.68	97.07	149.33	218.83	309.15	569.05	748.27	1233.4	4223.8	11166.
	14	50.69	84.56	262.82	406.22	596.79	844.49	1557.4	2049.0	3379.8	11585.	30634.
950	8	29.88	34.24	54.01	77.69	113.07	159.35	292.50	384.30	632.74	2164.1	5718.9
	10	36.21	44.57	97.09	149.33	218.83	309.15	569.05	748.27	1233.4	4223.8	11166.
	14	51.80	84.86	262.82	406.22	596.79	844.49	1557.4	2049.0	3379.8	11585.	30634.
1000	8	30.66	35.03	54.54	77.78	113.07	159.35	292.50	384.30	632.74	2164.1	5718.9
	10	37.12	45.45	97.12	149.33	218.83	309.15	569.05	748.27	1233.4	4223.8	11166.
	14	52.90	85.20	262.82	406.22	596.79	844.49	1557.4	2049.0	3379.8	11585.	30634.

TIME TO ACTIVATE HEAT DETECTOR, MINUTES

SPACING = 12.5 m (RADIUS = 8.8 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	1.40	1.37	1.45	1.50	1.56	1.63	1.77	1.84	1.99	2.54	3.34
	10	1.48	1.46	1.54	1.60	1.67	1.75	1.91	2.00	2.18	2.92	4.51
	14	1.63	1.61	1.73	1.81	1.90	2.00	2.22	2.34	2.64	4.44	9.53
100	8	1.66	1.64	1.73	1.79	1.87	1.94	2.11	2.20	2.38	3.01	3.85
	10	1.78	1.76	1.86	1.94	2.03	2.12	2.31	2.41	2.63	3.45	4.83
	14	1.99	1.99	2.13	2.23	2.34	2.46	2.72	2.87	3.20	4.80	9.53
150	8	1.87	1.85	1.95	2.03	2.11	2.20	2.38	2.48	2.69	3.39	4.28
	10	2.02	2.00	2.12	2.21	2.31	2.41	2.63	2.74	2.99	3.89	5.26
	14	2.29	2.29	2.45	2.57	2.69	2.83	3.13	3.29	3.65	5.25	9.55
200	8	2.05	2.03	2.15	2.23	2.32	2.42	2.62	2.73	2.96	3.71	4.67
	10	2.22	2.21	2.35	2.45	2.55	2.66	2.91	3.03	3.30	4.27	5.67
	14	2.54	2.55	2.73	2.86	3.00	3.15	3.47	3.65	4.04	5.69	9.63
250	8	2.21	2.19	2.32	2.41	2.51	2.62	2.84	2.95	3.20	4.01	5.02
	10	2.41	2.40	2.55	2.66	2.77	2.89	3.15	3.29	3.58	4.61	6.06
	14	2.78	2.78	2.99	3.12	3.27	3.44	3.79	3.98	4.40	6.10	9.80
300	8	2.36	2.34	2.48	2.58	2.69	2.80	3.03	3.16	3.42	4.28	5.34
	10	2.58	2.57	2.74	2.85	2.97	3.10	3.38	3.53	3.84	4.93	6.42
	14	2.99	3.00	3.22	3.37	3.53	3.70	4.08	4.28	4.72	6.48	10.03
350	8	2.50	2.49	2.64	2.74	2.85	2.97	3.22	3.35	3.62	4.53	5.64
	10	2.75	2.74	2.91	3.03	3.16	3.30	3.60	3.75	4.08	5.22	6.76
	14	3.19	3.20	3.44	3.59	3.76	3.95	4.34	4.56	5.02	6.85	10.31
400	8	2.64	2.62	2.78	2.89	3.00	3.13	3.39	3.53	3.82	4.77	5.92
	10	2.90	2.89	3.08	3.20	3.34	3.49	3.80	3.96	4.30	5.50	7.08
	14	3.38	3.39	3.64	3.81	3.99	4.18	4.60	4.82	5.31	7.19	10.60
450	8	2.76	2.75	2.91	3.03	3.15	3.28	3.56	3.70	4.00	4.99	6.19
	10	3.04	3.04	3.23	3.37	3.51	3.66	3.99	4.16	4.52	5.76	7.39
	14	3.56	3.57	3.84	4.01	4.20	4.40	4.83	5.07	5.58	7.52	10.91
500	8	2.88	2.87	3.04	3.16	3.29	3.43	3.71	3.86	4.17	5.21	6.44
	10	3.18	3.18	3.38	3.52	3.67	3.83	4.17	4.35	4.72	6.01	7.68
	14	3.73	3.74	4.02	4.20	4.40	4.61	5.06	5.31	5.83	7.83	11.21

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.5 m (RADIUS = 8.8 m)
FIRE GROWTH: ULTRAFAST ($\alpha = .1875 \text{ kJ/s}^3$)

RESPONSE TIME INDEX	RATE OF RISE $^{\circ}\text{C/min}$	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	3.00	2.99	3.17	3.29	3.42	3.57	3.86	4.02	4.34	5.41	6.69
	10	3.31	3.31	3.53	3.67	3.83	3.99	4.34	4.53	4.92	6.25	7.97
	14	3.89	3.91	4.20	4.39	4.59	4.81	5.28	5.54	6.08	8.13	11.52
600	8	3.11	3.10	3.29	3.41	3.55	3.70	4.01	4.17	4.50	5.61	6.92
	10	3.44	3.44	3.67	3.81	3.98	4.15	4.51	4.70	5.11	6.48	8.24
	14	4.05	4.07	4.37	4.57	4.78	5.00	5.49	5.75	6.32	8.42	11.82
650	8	3.22	3.21	3.40	3.54	3.68	3.83	4.15	4.32	4.66	5.80	7.15
	10	3.57	3.57	3.80	3.95	4.12	4.30	4.67	4.87	5.29	6.71	8.51
	14	4.20	4.22	4.54	4.74	4.96	5.19	5.70	5.97	6.55	8.70	12.12
700	8	3.32	3.31	3.52	3.65	3.80	3.96	4.28	4.46	4.81	5.99	7.37
	10	3.69	3.69	3.93	4.09	4.26	4.44	4.83	5.04	5.46	6.92	8.76
	14	4.35	4.37	4.70	4.91	5.13	5.37	5.89	6.17	6.77	8.97	12.41
750	8	3.43	3.42	3.62	3.76	3.92	4.08	4.42	4.59	4.96	6.17	7.58
	10	3.80	3.80	4.05	4.22	4.40	4.58	4.98	5.19	5.63	7.13	9.01
	14	4.49	4.52	4.85	5.07	5.30	5.55	6.08	6.37	6.98	9.23	12.70
800	8	3.52	3.51	3.73	3.88	4.03	4.20	4.54	4.73	5.10	6.34	7.79
	10	3.92	3.92	4.18	4.35	4.53	4.72	5.13	5.35	5.80	7.33	9.25
	14	4.63	4.66	5.00	5.23	5.47	5.72	6.27	6.56	7.19	9.49	12.99
850	8	3.62	3.61	3.83	3.98	4.14	4.31	4.67	4.86	5.24	6.51	7.99
	10	4.03	4.03	4.29	4.47	4.66	4.86	5.28	5.50	5.96	7.53	9.49
	14	4.77	4.80	5.15	5.38	5.63	5.89	6.45	6.75	7.39	9.74	13.26
900	8	3.72	3.71	3.93	4.09	4.25	4.43	4.79	4.98	5.38	6.68	8.19
	10	4.14	4.14	4.41	4.59	4.78	4.99	5.42	5.65	6.12	7.73	9.72
	14	4.90	4.93	5.29	5.53	5.78	6.05	6.63	6.94	7.59	9.98	13.54
950	8	3.81	3.80	4.03	4.19	4.36	4.54	4.91	5.11	5.51	6.84	8.38
	10	4.24	4.25	4.52	4.71	4.91	5.11	5.56	5.79	6.27	7.91	9.94
	14	5.03	5.06	5.44	5.68	5.93	6.21	6.80	7.12	7.79	10.22	13.81
1000	8	3.90	3.89	4.13	4.29	4.46	4.64	5.03	5.23	5.64	7.00	8.57
	10	4.35	4.35	4.64	4.82	5.03	5.24	5.69	5.93	6.43	8.10	10.16
	14	5.16	5.19	5.57	5.82	6.08	6.37	6.97	7.29	7.98	10.46	14.07

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.5 m (RADIUS = 8.8 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE
 TIME INDEX

(m*s)^{1/2}

RATE
 OF RISE

°C/min

CEILING HEIGHT, m

	1	2	4	5	6	7	9	10	12	18	24
50	2.25 2.43 2.79	2.25 2.46 2.88	2.44 2.72 3.36	2.58 2.91 3.74	2.74 3.13 4.28	2.91 3.40 5.11	3.35 4.18 8.09	3.63 4.79 10.23	4.43 6.78 15.94	10.88 19.53 50.45	25.82 48.44 129.30
100	2.78 3.05 3.55	2.79 3.09 3.67	3.04 3.41 4.22	3.20 3.63 4.62	3.39 3.88 5.13	3.59 4.18 5.81	4.08 4.93 8.21	4.37 5.45 10.24	5.10 7.01 15.94	10.88 19.53 50.45	25.82 48.44 129.30
150	3.21 3.54 4.17	3.23 3.59 4.30	3.51 3.96 4.92	3.70 4.21 5.35	3.91 4.49 5.87	4.14 4.81 6.53	4.67 5.60 8.62	4.98 6.10 10.39	5.73 7.50 15.94	10.93 19.53 50.45	25.82 48.44 129.30
200	3.58 3.97 4.70	3.61 4.03 4.85	3.92 4.44 5.52	4.13 4.71 5.98	4.36 5.01 6.52	4.61 5.36 7.19	5.18 6.18 9.15	5.51 6.69 10.72	6.29 8.05 15.96	11.10 19.53 50.45	25.82 48.44 129.30
250	3.91 4.35 5.18	3.95 4.42 5.35	4.29 4.87 6.06	4.51 5.16 6.54	4.76 5.48 7.11	5.03 5.85 7.79	5.64 6.71 9.71	5.99 7.24 11.16	6.80 8.58 16.03	11.38 19.54 50.45	25.82 48.44 129.30
300	4.22 4.71 5.63	4.26 4.79 5.80	4.63 5.26 6.56	4.87 5.57 7.06	5.13 5.92 7.65	5.42 6.30 8.35	6.06 7.20 10.25	6.43 7.74 11.64	7.27 9.10 16.18	11.73 19.56 50.45	25.82 48.44 129.30
350	4.51 5.04 6.04	4.55 5.12 6.22	4.94 5.63 7.02	5.20 5.96 7.55	5.48 6.32 8.16	5.78 6.72 8.88	6.46 7.66 10.78	6.84 8.22 12.13	7.71 9.59 16.40	12.11 19.61 50.45	25.82 48.44 129.30
400	4.78 5.35 6.43	4.83 5.44 6.62	5.24 5.98 7.46	5.51 6.32 8.01	5.80 6.70 8.64	6.12 7.12 9.37	6.83 8.09 11.29	7.23 8.67 12.61	8.12 10.05 16.69	12.51 19.69 50.45	25.83 48.44 129.30
450	5.04 5.65 6.80	5.09 5.75 7.00	5.52 6.30 7.87	5.80 6.66 8.44	6.11 7.06 9.09	6.44 7.50 9.85	7.18 8.50 11.79	7.59 9.09 13.09	8.52 10.50 17.01	12.91 19.83 50.45	25.84 48.44 129.30
500	5.29 5.94 7.15	5.34 6.03 7.36	5.79 6.62 8.27	6.09 6.99 8.85	6.40 7.40 9.53	6.75 7.86 10.30	7.52 8.90 12.26	7.94 9.50 13.56	8.90 10.93 17.37	13.31 20.00 50.45	25.86 48.44 129.30

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.5 m (RADIUS = 8.8 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	5.52	5.58	6.05	6.36	6.69	7.05	7.84	8.28	9.26	13.70	25.91
	10	6.21	6.31	6.92	7.30	7.73	8.20	9.27	9.89	11.35	20.21	48.44
	14	7.49	7.71	8.65	9.25	9.94	10.73	12.72	14.02	17.74	50.45	129.30
600	8	5.75	5.81	6.30	6.62	6.96	7.33	8.15	8.60	9.61	14.09	25.97
	10	6.47	6.58	7.21	7.61	8.05	8.53	9.63	10.26	11.75	20.46	48.44
	14	7.81	8.04	9.01	9.63	10.34	11.15	13.16	14.46	18.12	50.45	129.30
650	8	5.97	6.03	6.54	6.87	7.22	7.60	8.45	8.91	9.94	14.47	26.05
	10	6.72	6.84	7.49	7.90	8.35	8.85	9.98	10.63	12.13	20.72	48.44
	14	8.13	8.36	9.36	10.00	10.73	11.55	13.59	14.90	18.51	50.45	129.30
700	8	6.18	6.25	6.77	7.11	7.48	7.87	8.74	9.21	10.27	14.84	26.16
	10	6.97	7.09	7.76	8.18	8.65	9.16	10.32	10.98	12.51	21.00	48.44
	14	8.43	8.67	9.70	10.36	11.10	11.94	14.01	15.32	18.90	50.45	129.30
750	8	6.39	6.46	7.00	7.35	7.72	8.13	9.02	9.50	10.58	15.21	26.29
	10	7.21	7.33	8.02	8.46	8.94	9.46	10.65	11.32	12.88	21.30	48.44
	14	8.73	8.98	10.03	10.70	11.46	12.32	14.42	15.74	19.29	50.45	129.30
800	8	6.59	6.67	7.22	7.58	7.96	8.38	9.29	9.79	10.89	15.57	26.44
	10	7.44	7.57	8.27	8.72	9.22	9.75	10.96	11.65	13.23	21.60	48.44
	14	9.02	9.27	10.35	11.04	11.81	12.69	14.81	16.14	19.68	50.45	129.30
850	8	6.79	6.86	7.44	7.80	8.20	8.62	9.55	10.07	11.19	15.92	26.62
	10	7.67	7.80	8.52	8.98	9.49	10.04	11.27	11.97	13.58	21.92	48.45
	14	9.30	9.56	10.66	11.37	12.16	13.05	15.20	16.54	20.07	50.46	129.30
900	8	6.98	7.06	7.64	8.02	8.42	8.86	9.81	10.34	11.48	16.26	26.80
	10	7.89	8.02	8.77	9.24	9.75	10.32	11.58	12.29	13.92	22.23	48.45
	14	9.57	9.84	10.97	11.69	12.49	13.40	15.58	16.92	20.45	50.46	129.30
950	8	7.17	7.25	7.85	8.23	8.65	9.09	10.07	10.60	11.77	16.60	27.01
	10	8.10	8.24	9.00	9.48	10.01	10.59	11.87	12.60	14.25	22.55	48.45
	14	9.84	10.11	11.27	12.00	12.82	13.74	15.95	17.30	20.83	50.46	129.30
1000	8	7.35	7.44	8.05	8.44	8.86	9.32	10.31	10.86	12.05	16.93	27.22
	10	8.32	8.45	9.23	9.73	10.27	10.85	12.16	12.90	14.57	22.87	48.46
	14	10.10	10.38	11.56	12.30	13.14	14.07	16.31	17.68	21.20	50.47	129.30

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.5 m (RADIUS = 8.8 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	4.00	4.26	5.59	7.04	9.43	12.66	21.87	28.16	45.06	147.61	382.53	
	10	4.53	5.06	8.34	11.98	16.84	23.11	40.98	53.21	86.09	286.04	744.51	
	14	5.77	7.74	20.06	30.10	43.35	60.46	109.28	142.74	232.75	780.75	2038.2	
100	8	5.12	5.43	6.73	7.87	9.72	12.69	21.87	28.16	45.06	147.61	382.53	
	10	5.84	6.40	9.04	12.07	16.84	23.11	40.98	53.21	86.09	286.04	744.51	
	14	7.41	9.05	20.06	30.10	43.35	60.46	109.28	142.74	232.75	780.75	2038.2	
150	8	6.02	6.36	7.72	8.80	10.40	12.93	21.87	28.16	45.06	147.61	382.53	
	10	6.89	7.48	9.98	12.53	16.89	23.11	40.98	53.21	86.09	286.04	744.51	
	14	8.74	10.31	20.09	30.10	43.35	60.46	109.28	142.74	232.75	780.75	2038.2	
200	8	6.80	7.17	8.59	9.67	11.17	13.42	21.88	28.16	45.06	147.61	382.53	
	10	7.80	8.42	10.91	13.21	17.09	23.12	40.98	53.21	86.09	286.04	744.51	
	14	9.88	11.45	20.25	30.10	43.35	60.46	109.28	142.74	232.75	780.75	2038.2	
250	8	7.51	7.89	9.38	10.47	11.93	14.02	21.93	28.16	45.06	147.61	382.53	
	10	8.62	9.27	11.78	13.95	17.48	23.18	40.98	53.21	86.09	286.04	744.51	
	14	10.91	12.49	20.59	30.12	43.35	60.46	109.28	142.74	232.75	780.75	2038.2	
300	8	8.15	8.56	10.11	11.22	12.67	14.67	22.06	28.18	45.06	147.61	382.53	
	10	9.37	10.05	12.60	14.71	17.98	23.32	40.98	53.21	86.09	286.04	744.51	
	14	11.86	13.46	21.09	30.16	43.35	60.46	109.28	142.74	232.75	780.75	2038.2	
350	8	8.75	9.18	10.79	11.92	13.37	15.32	22.27	28.21	45.06	147.61	382.53	
	10	10.07	10.77	13.37	15.45	18.56	23.55	40.98	53.21	86.09	286.04	744.51	
	14	12.74	14.37	21.68	30.26	43.35	60.46	109.28	142.74	232.75	780.75	2038.2	
400	8	9.32	9.76	11.43	12.58	14.05	15.96	22.57	28.29	45.06	147.61	382.53	
	10	10.72	11.45	14.10	16.16	19.16	23.87	40.98	53.21	86.09	286.04	744.51	
	14	13.57	15.22	22.32	30.43	43.36	60.46	109.28	142.74	232.75	780.75	2038.2	
450	8	9.85	10.32	12.03	13.22	14.69	16.59	22.93	28.42	45.06	147.61	382.53	
	10	11.35	12.10	14.80	16.86	19.78	24.26	40.99	53.21	86.09	286.04	744.51	
	14	14.36	16.03	22.99	30.69	43.37	60.46	109.28	142.74	232.75	780.75	2038.2	
500	8	10.37	10.84	12.61	13.82	15.31	17.21	23.34	28.60	45.06	147.61	382.53	
	10	11.94	12.72	15.47	17.53	20.40	24.70	41.01	53.21	86.09	286.04	744.51	
	14	15.11	16.81	23.67	31.01	43.40	60.46	109.28	142.74	232.75	780.75	2038.2	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.5 m (RADIUS = 8.8 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}	°C/min											
550	8	10.86	11.35	13.17	14.40	15.91	17.81	23.78	28.83	45.07	147.61	382.53
	10	12.52	13.31	16.11	18.18	21.02	25.18	41.04	53.21	86.09	286.04	744.51
	14	15.83	17.55	24.35	31.39	43.45	60.46	109.28	142.74	232.75	780.75	2038.2
600	8	11.33	11.84	13.70	14.96	16.49	18.39	24.24	29.11	45.08	147.61	382.53
	10	13.07	13.88	16.73	18.81	21.62	25.67	41.09	53.22	86.09	286.04	744.51
	14	16.52	18.27	25.03	31.82	43.53	60.46	109.28	142.74	232.75	780.75	2038.2
650	8	11.79	12.31	14.22	15.50	17.04	18.95	24.72	29.42	45.10	147.61	382.53
	10	13.60	14.43	17.33	19.43	22.22	26.18	41.17	53.22	86.09	286.04	744.51
	14	17.19	18.96	25.70	32.29	43.64	60.46	109.28	142.74	232.75	780.75	2038.2
700	8	12.24	12.77	14.72	16.02	17.59	19.51	25.20	29.77	45.13	147.61	382.53
	10	14.11	14.96	17.91	20.02	22.81	26.70	41.27	53.23	86.09	286.04	744.51
	14	17.84	19.63	26.36	32.78	43.79	60.47	109.28	142.74	232.75	780.75	2038.2
750	8	12.67	13.21	15.21	16.53	18.11	20.05	25.69	30.14	45.18	147.61	382.53
	10	14.61	15.47	18.47	20.60	23.39	27.22	41.40	53.25	86.09	286.04	744.51
	14	18.46	20.28	27.01	33.29	43.97	60.48	109.28	142.74	232.75	780.75	2038.2
800	8	13.08	13.64	15.68	17.02	18.63	20.57	26.17	30.52	45.24	147.61	382.53
	10	15.10	15.97	19.02	21.17	23.95	27.74	41.56	53.28	86.09	286.04	744.51
	14	19.07	20.92	27.65	33.81	44.19	60.51	109.28	142.74	232.75	780.75	2038.2
850	8	13.49	14.06	16.14	17.50	19.13	21.09	26.66	30.92	45.32	147.61	382.53
	10	15.57	16.46	19.56	21.72	24.51	28.26	41.75	53.31	86.09	286.04	744.51
	14	19.67	21.53	28.28	34.34	44.44	60.54	109.28	142.74	232.75	780.75	2038.2
900	8	13.89	14.47	16.58	17.97	19.62	21.59	27.14	31.33	45.42	147.61	382.53
	10	16.03	16.94	20.08	22.26	25.05	28.78	41.97	53.36	86.09	286.04	744.51
	14	20.25	22.13	28.90	34.87	44.73	60.58	109.28	142.74	232.75	780.75	2038.2
950	8	14.28	14.86	17.02	18.43	20.10	22.08	27.62	31.75	45.55	147.61	382.53
	10	16.48	17.40	20.59	22.79	25.59	29.29	42.22	53.43	86.10	286.04	744.51
	14	20.82	22.72	29.51	35.41	45.04	60.63	109.28	142.74	232.75	780.75	2038.2
1000	8	14.66	15.26	17.45	18.88	20.56	22.57	28.10	32.17	45.69	147.61	382.53
	10	16.92	17.86	21.09	23.31	26.12	29.80	42.48	53.51	86.10	286.04	744.51
	14	21.37	23.29	30.11	35.95	45.37	60.70	109.28	142.74	232.75	780.75	2038.2

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.5 m (RADIUS = 8.8 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
		(m*s) ^{1/2}											
50	8	9.93	19.56	57.34	87.23	126.68	177.66	323.23	423.00	691.53	2326.9	6080.2	
	10	15.55	36.34	110.05	168.37	245.37	344.86	629.04	823.81	1348.1	4541.8	11872.	
	14	38.89	96.27	298.44	458.37	669.53	942.41	1721.9	2256.2	3694.6	12457.	32570.	
100	8	12.06	19.67	57.34	87.23	126.68	177.66	323.23	423.00	691.53	2326.9	6080.2	
	10	16.70	36.34	110.05	168.37	245.37	344.86	629.04	823.81	1348.1	4541.8	11872.	
	14	38.89	96.27	298.44	458.37	669.53	942.41	1721.9	2256.2	3694.6	12457.	32570.	
150	8	13.93	20.26	57.34	87.23	126.68	177.66	323.23	423.00	691.53	2326.9	6080.2	
	10	18.43	36.34	110.05	168.37	245.37	344.86	629.04	823.81	1348.1	4541.8	11872.	
	14	38.93	96.27	298.44	458.37	669.53	942.41	1721.9	2256.2	3694.6	12457.	32570.	
200	8	15.59	21.25	57.34	87.23	126.68	177.66	323.23	423.00	691.53	2326.9	6080.2	
	10	20.16	36.39	110.05	168.37	245.37	344.86	629.04	823.81	1348.1	4541.8	11872.	
	14	39.14	96.27	298.44	458.37	669.53	942.41	1721.9	2256.2	3694.6	12457.	32570.	
250	8	17.09	22.39	57.34	87.23	126.68	177.66	323.23	423.00	691.53	2326.9	6080.2	
	10	21.79	36.56	110.05	168.37	245.37	344.86	629.04	823.81	1348.1	4541.8	11872.	
	14	39.65	96.27	298.44	458.37	669.53	942.41	1721.9	2256.2	3694.6	12457.	32570.	
300	8	18.47	23.57	57.34	87.23	126.68	177.66	323.23	423.00	691.53	2326.9	6080.2	
	10	23.34	36.93	110.05	168.37	245.37	344.86	629.04	823.81	1348.1	4541.8	11872.	
	14	40.46	96.27	298.44	458.37	669.53	942.41	1721.9	2256.2	3694.6	12457.	32570.	
350	8	19.76	24.73	57.34	87.23	126.68	177.66	323.23	423.00	691.53	2326.9	6080.2	
	10	24.80	37.48	110.05	168.37	245.37	344.86	629.04	823.81	1348.1	4541.8	11872.	
	14	41.48	96.27	298.44	458.37	669.53	942.41	1721.9	2256.2	3694.6	12457.	32570.	
400	8	20.98	25.87	57.35	87.23	126.68	177.66	323.23	423.00	691.53	2326.9	6080.2	
	10	26.19	38.18	110.05	168.37	245.37	344.86	629.04	823.81	1348.1	4541.8	11872.	
	14	42.62	96.27	298.44	458.37	669.53	942.41	1721.9	2256.2	3694.6	12457.	32570.	
450	8	22.14	26.97	57.37	87.23	126.68	177.66	323.23	423.00	691.53	2326.9	6080.2	
	10	27.51	38.97	110.05	168.37	245.37	344.86	629.04	823.81	1348.1	4541.8	11872.	
	14	43.83	96.27	298.44	458.37	669.53	942.41	1721.9	2256.2	3694.6	12457.	32570.	
500	8	23.24	28.04	57.41	87.23	126.68	177.66	323.23	423.00	691.53	2326.9	6080.2	
	10	28.78	39.84	110.05	168.37	245.37	344.86	629.04	823.81	1348.1	4541.8	11872.	
	14	45.08	96.28	298.44	458.37	669.53	942.41	1721.9	2256.2	3694.6	12457.	32570.	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.5 m (RADIUS = 8.8 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}	°C/min											
	8	24.30	29.09	57.49	87.23	126.68	177.66	323.23	423.00	691.53	2326.9	6080.2
	10	30.01	40.74	110.05	168.37	245.37	344.86	629.04	823.81	1348.1	4541.8	11872.
	14	46.33	96.28	298.44	458.37	669.53	942.41	1721.9	2256.2	3694.6	12457.	32570.
600	8	25.32	30.10	57.60	87.23	126.68	177.66	323.23	423.00	691.53	2326.9	6080.2
	10	31.18	41.66	110.05	168.37	245.37	344.86	629.04	823.81	1348.1	4541.8	11872.
	14	47.59	96.29	298.44	458.37	669.53	942.41	1721.9	2256.2	3694.6	12457.	32570.
650	8	26.30	31.08	57.76	87.23	126.68	177.66	323.23	423.00	691.53	2326.9	6080.2
	10	32.32	42.60	110.05	168.37	245.37	344.86	629.04	823.81	1348.1	4541.8	11872.
	14	48.84	96.31	298.44	458.37	669.53	942.41	1721.9	2256.2	3694.6	12457.	32570.
700	8	27.25	32.04	57.97	87.23	126.68	177.66	323.23	423.00	691.53	2326.9	6080.2
	10	33.42	43.54	110.05	168.37	245.37	344.86	629.04	823.81	1348.1	4541.8	11872.
	14	50.07	96.34	298.44	458.37	669.53	942.41	1721.9	2256.2	3694.6	12457.	32570.
750	8	28.17	32.97	58.23	87.24	126.68	177.66	323.23	423.00	691.53	2326.9	6080.2
	10	34.50	44.48	110.05	168.37	245.37	344.86	629.04	823.81	1348.1	4541.8	11872.
	14	51.29	96.39	298.44	458.37	669.53	942.41	1721.9	2256.2	3694.6	12457.	32570.
800	8	29.07	33.88	58.54	87.25	126.68	177.66	323.23	423.00	691.53	2326.9	6080.2
	10	35.54	45.42	110.05	168.37	245.37	344.86	629.04	823.81	1348.1	4541.8	11872.
	14	52.49	96.47	298.44	458.37	669.53	942.41	1721.9	2256.2	3694.6	12457.	32570.
850	8	29.94	34.77	58.89	87.27	126.68	177.66	323.23	423.00	691.53	2326.9	6080.2
	10	36.56	46.34	110.06	168.37	245.37	344.86	629.04	823.81	1348.1	4541.8	11872.
	14	53.68	96.57	298.44	458.37	669.53	942.41	1721.9	2256.2	3694.6	12457.	32570.
900	8	30.80	35.64	59.28	87.29	126.68	177.66	323.23	423.00	691.53	2326.9	6080.2
	10	37.55	47.26	110.06	168.37	245.37	344.86	629.04	823.81	1348.1	4541.8	11872.
	14	54.84	96.70	298.44	458.37	669.53	942.41	1721.9	2256.2	3694.6	12457.	32570.
950	8	31.63	36.49	59.71	87.33	126.68	177.66	323.23	423.00	691.53	2326.9	6080.2
	10	38.52	48.17	110.07	168.37	245.37	344.86	629.04	823.81	1348.1	4541.8	11872.
	14	55.99	96.86	298.44	458.37	669.53	942.41	1721.9	2256.2	3694.6	12457.	32570.
1000	8	32.44	37.32	60.16	87.37	126.68	177.66	323.23	423.00	691.53	2326.9	6080.2
	10	39.47	49.07	110.08	168.37	245.37	344.86	629.04	823.81	1348.1	4541.8	11872.
	14	57.12	97.07	298.44	458.37	669.53	942.41	1721.9	2256.2	3694.6	12457.	32570.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.0 m (RADIUS = 9.2 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	1.46	1.43	1.50	1.55	1.61	1.68	1.81	1.89	2.04	2.60	3.43	
	10	1.54	1.51	1.59	1.66	1.73	1.80	1.96	2.05	2.24	3.00	4.69	
	14	1.69	1.68	1.79	1.87	1.96	2.06	2.29	2.42	2.73	4.67	10.04	
100	8	1.73	1.70	1.79	1.85	1.92	2.00	2.17	2.26	2.44	3.08	3.94	
	10	1.85	1.83	1.93	2.01	2.09	2.18	2.38	2.48	2.71	3.54	5.00	
	14	2.08	2.07	2.21	2.31	2.42	2.54	2.81	2.96	3.30	5.00	10.04	
150	8	1.94	1.92	2.02	2.09	2.18	2.27	2.45	2.55	2.76	3.47	4.39	
	10	2.10	2.08	2.20	2.29	2.38	2.49	2.71	2.83	3.08	3.99	5.42	
	14	2.39	2.38	2.55	2.66	2.79	2.93	3.23	3.40	3.77	5.45	10.05	
200	8	2.13	2.11	2.22	2.31	2.40	2.49	2.70	2.81	3.04	3.81	4.78	
	10	2.32	2.30	2.44	2.53	2.64	2.75	2.99	3.12	3.40	4.38	5.84	
	14	2.65	2.65	2.84	2.97	3.11	3.26	3.59	3.77	4.17	5.89	10.12	
250	8	2.31	2.28	2.41	2.50	2.59	2.70	2.92	3.04	3.28	4.11	5.14	
	10	2.51	2.50	2.65	2.75	2.87	2.99	3.25	3.39	3.69	4.74	6.23	
	14	2.90	2.90	3.10	3.24	3.39	3.56	3.91	4.11	4.54	6.31	10.26	
300	8	2.46	2.44	2.57	2.67	2.78	2.89	3.13	3.25	3.51	4.39	5.47	
	10	2.70	2.68	2.84	2.95	3.08	3.21	3.49	3.64	3.95	5.06	6.60	
	14	3.12	3.12	3.34	3.49	3.66	3.83	4.21	4.42	4.87	6.70	10.48	
350	8	2.61	2.59	2.73	2.83	2.95	3.06	3.32	3.45	3.72	4.65	5.77	
	10	2.86	2.85	3.02	3.14	3.27	3.41	3.71	3.87	4.20	5.36	6.94	
	14	3.33	3.33	3.57	3.73	3.90	4.09	4.49	4.71	5.18	7.07	10.74	
400	8	2.75	2.73	2.88	2.99	3.11	3.23	3.49	3.63	3.92	4.89	6.06	
	10	3.02	3.01	3.19	3.32	3.46	3.60	3.92	4.08	4.43	5.65	7.28	
	14	3.53	3.53	3.78	3.95	4.13	4.33	4.75	4.98	5.48	7.42	11.03	
450	8	2.88	2.86	3.02	3.13	3.26	3.39	3.66	3.81	4.11	5.12	6.34	
	10	3.18	3.16	3.36	3.49	3.63	3.79	4.11	4.29	4.65	5.92	7.59	
	14	3.71	3.72	3.99	4.16	4.35	4.56	5.00	5.24	5.76	7.76	11.33	
500	8	3.01	2.99	3.16	3.27	3.40	3.54	3.83	3.98	4.29	5.34	6.60	
	10	3.32	3.31	3.51	3.65	3.80	3.96	4.30	4.48	4.86	6.17	7.89	
	14	3.89	3.90	4.18	4.36	4.56	4.77	5.24	5.48	6.02	8.08	11.63	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.0 m (RADIUS = 9.2 m)
FIRE GROWTH: ULTRAFast (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	3.13	3.11	3.29	3.41	3.54	3.68	3.98	4.14	4.47	5.55	6.85	
	10	3.46	3.45	3.66	3.81	3.96	4.13	4.48	4.67	5.06	6.42	8.18	
	14	4.06	4.07	4.36	4.55	4.76	4.98	5.46	5.72	6.28	8.39	11.93	
600	8	3.25	3.23	3.41	3.54	3.68	3.82	4.13	4.30	4.63	5.76	7.09	
	10	3.59	3.58	3.80	3.95	4.12	4.29	4.66	4.85	5.26	6.66	8.46	
	14	4.23	4.24	4.54	4.74	4.95	5.18	5.68	5.95	6.52	8.68	12.24	
650	8	3.36	3.34	3.53	3.66	3.81	3.96	4.28	4.45	4.80	5.95	7.32	
	10	3.72	3.71	3.94	4.10	4.27	4.45	4.83	5.03	5.45	6.89	8.73	
	14	4.39	4.40	4.71	4.92	5.14	5.38	5.89	6.17	6.76	8.97	12.54	
700	8	3.47	3.45	3.65	3.78	3.93	4.09	4.42	4.59	4.95	6.14	7.55	
	10	3.85	3.84	4.08	4.24	4.41	4.60	4.99	5.19	5.63	7.11	8.99	
	14	4.54	4.56	4.88	5.09	5.32	5.57	6.09	6.38	6.99	9.25	12.84	
750	8	3.57	3.56	3.76	3.90	4.05	4.21	4.56	4.73	5.10	6.33	7.77	
	10	3.97	3.96	4.21	4.37	4.55	4.74	5.15	5.36	5.80	7.32	9.25	
	14	4.69	4.71	5.04	5.26	5.50	5.75	6.29	6.58	7.21	9.52	13.13	
800	8	3.68	3.66	3.87	4.02	4.17	4.34	4.69	4.87	5.25	6.51	7.98	
	10	4.09	4.08	4.34	4.51	4.69	4.88	5.30	5.52	5.98	7.53	9.49	
	14	4.84	4.86	5.20	5.42	5.67	5.93	6.48	6.78	7.42	9.78	13.42	
850	8	3.78	3.76	3.98	4.13	4.29	4.46	4.82	5.00	5.39	6.68	8.19	
	10	4.21	4.20	4.46	4.63	4.82	5.02	5.45	5.67	6.14	7.74	9.74	
	14	4.98	5.00	5.35	5.58	5.83	6.10	6.67	6.98	7.63	10.04	13.70	
900	8	3.88	3.86	4.08	4.24	4.40	4.57	4.94	5.14	5.54	6.85	8.39	
	10	4.32	4.31	4.58	4.76	4.95	5.16	5.59	5.82	6.31	7.94	9.97	
	14	5.12	5.14	5.50	5.74	6.00	6.27	6.85	7.17	7.84	10.29	13.98	
950	8	3.97	3.96	4.19	4.34	4.51	4.69	5.07	5.26	5.67	7.02	8.59	
	10	4.43	4.42	4.70	4.88	5.08	5.29	5.74	5.97	6.46	8.13	10.20	
	14	5.26	5.28	5.65	5.89	6.15	6.43	7.03	7.35	8.04	10.53	14.25	
1000	8	4.07	4.05	4.29	4.45	4.62	4.80	5.19	5.39	5.81	7.18	8.78	
	10	4.54	4.53	4.81	5.00	5.21	5.42	5.88	6.12	6.62	8.32	10.43	
	14	5.39	5.42	5.79	6.04	6.31	6.59	7.21	7.54	8.23	10.77	14.52	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.0 m (RADIUS = 9.2 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE
 TIME INDEX

RATE
 OF RISE

(m*s)^{1/2}

°C/min

CEILING HEIGHT, m

	1	2	4	5	6	7	9	10	12	18	24
50	2.35 2.54 2.91	2.34 2.56 3.01	2.54 2.83 3.53	2.68 3.03 3.94	2.84 3.26 4.55	3.02 3.55 5.51	3.49 4.41 8.81	3.79 5.09 11.12	4.66 7.28 17.28	11.57 20.87 54.07	27.32 51.35 137.23
100	2.90 3.18 3.72	2.91 3.22 3.84	3.15 3.55 4.42	3.32 3.78 4.85	3.51 4.04 5.41	3.73 4.35 6.16	4.23 5.16 8.89	4.54 5.72 11.13	5.32 7.46 17.28	11.58 20.87 54.07	27.32 51.35 137.23
150	3.35 3.70 4.36	3.36 3.75 4.50	3.65 4.13 5.15	3.84 4.38 5.60	4.05 4.67 6.16	4.29 5.01 6.88	4.84 5.84 9.23	5.17 6.38 11.23	5.96 7.91 17.28	11.61 20.87 54.07	27.32 51.35 137.23
200	3.74 4.15 4.92	3.76 4.21 5.08	4.08 4.62 5.78	4.29 4.90 6.26	4.52 5.22 6.84	4.78 5.57 7.55	5.37 6.44 9.73	5.71 6.99 11.50	6.53 8.45 17.29	11.74 20.87 54.07	27.32 51.35 137.23
250	4.09 4.55 5.43	4.12 4.62 5.59	4.46 5.07 6.34	4.69 5.37 6.85	4.94 5.71 7.45	5.22 6.09 8.18	5.85 6.99 10.27	6.21 7.55 11.90	7.05 8.99 17.33	11.99 20.87 54.07	27.32 51.35 137.23
300	4.41 4.92 5.89	4.44 5.00 6.07	4.81 5.48 6.86	5.06 5.80 7.39	5.33 6.16 8.01	5.62 6.56 8.75	6.29 7.50 10.82	6.66 8.07 12.35	7.54 9.51 17.44	12.32 20.88 54.07	27.32 51.35 137.23
350	4.71 5.27 6.32	4.75 5.35 6.51	5.14 5.87 7.34	5.40 6.20 7.89	5.69 6.58 8.54	6.00 6.99 9.30	6.69 7.97 11.36	7.09 8.56 12.83	7.99 10.00 17.62	12.68 20.91 54.07	27.32 51.35 137.23
400	5.00 5.60 6.73	5.04 5.68 6.93	5.45 6.23 7.80	5.72 6.58 8.37	6.02 6.97 9.03	6.35 7.41 9.81	7.08 8.42 11.87	7.49 9.02 13.32	8.42 10.48 17.86	13.07 20.98 54.07	27.32 51.35 137.23
450	5.27 5.91 7.12	5.31 6.00 7.32	5.75 6.57 8.23	6.03 6.94 8.82	6.34 7.34 9.50	6.68 7.80 10.30	7.44 8.84 12.38	7.87 9.46 13.80	8.83 10.94 18.15	13.47 21.08 54.07	27.33 51.35 137.23
500	5.52 6.21 7.49	5.57 6.30 7.70	6.03 6.89 8.64	6.32 7.28 9.25	6.65 7.70 9.95	7.00 8.17 10.77	7.79 9.25 12.86	8.23 9.88 14.27	9.22 11.38 18.48	13.87 21.23 54.07	27.35 51.35 137.23

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.0 m (RADIUS = 9.2 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	5.77	5.82	6.30	6.60	6.94	7.31	8.12	8.57	9.59	14.27	27.38	
	10	6.49	6.59	7.21	7.60	8.04	8.53	9.64	10.28	11.81	21.41	51.35	
	14	7.84	8.06	9.03	9.66	10.39	11.22	13.33	14.73	18.83	54.07	137.23	
600	8	6.01	6.06	6.56	6.88	7.23	7.60	8.44	8.91	9.95	14.66	27.43	
	10	6.77	6.87	7.51	7.92	8.37	8.87	10.01	10.67	12.22	21.63	51.35	
	14	8.18	8.41	9.41	10.06	10.80	11.65	13.79	15.19	19.20	54.07	137.23	
650	8	6.24	6.30	6.81	7.14	7.50	7.89	8.75	9.23	10.30	15.04	27.49	
	10	7.03	7.14	7.80	8.22	8.69	9.20	10.37	11.04	12.62	21.87	51.35	
	14	8.51	8.75	9.78	10.44	11.20	12.07	14.23	15.63	19.58	54.07	137.23	
700	8	6.46	6.52	7.05	7.39	7.76	8.16	9.05	9.54	10.63	15.42	27.58	
	10	7.29	7.40	8.08	8.52	9.00	9.52	10.72	11.40	13.01	22.13	51.35	
	14	8.83	9.07	10.13	10.81	11.59	12.47	14.66	16.07	19.96	54.07	137.23	
750	8	6.68	6.74	7.28	7.64	8.02	8.43	9.34	9.84	10.96	15.79	27.69	
	10	7.54	7.65	8.35	8.80	9.30	9.83	11.06	11.76	13.38	22.41	51.35	
	14	9.14	9.39	10.48	11.17	11.97	12.86	15.08	16.49	20.35	54.07	137.23	
800	8	6.89	6.96	7.51	7.87	8.27	8.69	9.62	10.14	11.27	16.15	27.82	
	10	7.78	7.90	8.62	9.08	9.59	10.14	11.39	12.10	13.75	22.71	51.35	
	14	9.44	9.70	10.81	11.52	12.33	13.25	15.49	16.90	20.74	54.07	137.23	
850	8	7.10	7.16	7.74	8.11	8.51	8.94	9.90	10.42	11.58	16.51	27.98	
	10	8.02	8.14	8.88	9.35	9.87	10.43	11.71	12.43	14.11	23.01	51.35	
	14	9.74	10.00	11.14	11.86	12.69	13.62	15.89	17.31	21.12	54.07	137.23	
900	8	7.30	7.37	7.96	8.33	8.75	9.19	10.17	10.70	11.88	16.86	28.15	
	10	8.25	8.38	9.13	9.61	10.14	10.72	12.02	12.76	14.45	23.31	51.35	
	14	10.02	10.29	11.45	12.20	13.04	13.98	16.28	17.71	21.51	54.08	137.23	
950	8	7.49	7.57	8.17	8.56	8.98	9.43	10.43	10.98	12.18	17.20	28.33	
	10	8.48	8.61	9.38	9.87	10.41	11.00	12.33	13.08	14.80	23.63	51.36	
	14	10.30	10.58	11.76	12.52	13.38	14.34	16.66	18.10	21.89	54.08	137.23	
1000	8	7.69	7.76	8.38	8.77	9.20	9.67	10.69	11.24	12.47	17.54	28.53	
	10	8.70	8.83	9.62	10.12	10.68	11.28	12.63	13.39	15.13	23.94	51.36	
	14	10.58	10.86	12.07	12.84	13.71	14.68	17.03	18.48	22.26	54.08	137.23	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.0 m (RADIUS = 9.2 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	4.19	4.48	5.99	7.69	10.38	13.94	23.97	30.79	49.01	158.38	406.19	
	10	4.76	5.36	9.25	13.32	18.68	25.57	45.05	58.31	93.79	307.05	790.69	
	14	6.13	8.55	22.55	33.70	48.33	67.13	120.39	156.68	253.80	838.33	2164.8	
100	8	5.37	5.70	7.13	8.43	10.58	13.95	23.97	30.79	49.01	158.38	406.19	
	10	6.14	6.76	9.80	13.37	18.68	25.57	45.05	58.31	93.79	307.05	790.69	
	14	7.85	9.76	22.55	33.70	48.33	67.13	120.39	156.68	253.80	838.33	2164.8	
150	8	6.32	6.67	8.15	9.35	11.18	14.11	23.97	30.79	49.01	158.38	406.19	
	10	7.24	7.89	10.71	13.70	18.70	25.57	45.05	58.31	93.79	307.05	790.69	
	14	9.24	11.04	22.56	33.70	48.33	67.13	120.39	156.68	253.80	838.33	2164.8	
200	8	7.13	7.52	9.05	10.24	11.92	14.51	23.97	30.79	49.01	158.38	406.19	
	10	8.20	8.88	11.64	14.30	18.83	25.57	45.05	58.31	93.79	307.05	790.69	
	14	10.44	12.21	22.64	33.70	48.33	67.13	120.39	156.68	253.80	838.33	2164.8	
250	8	7.87	8.28	9.87	11.06	12.69	15.06	24.00	30.79	49.01	158.38	406.19	
	10	9.05	9.76	12.52	15.01	19.12	25.60	45.05	58.31	93.79	307.05	790.69	
	14	11.52	13.30	22.87	33.71	48.33	67.13	120.39	156.68	253.80	838.33	2164.8	
300	8	8.55	8.98	10.63	11.83	13.43	15.68	24.08	30.80	49.01	158.38	406.19	
	10	9.84	10.58	13.36	15.75	19.54	25.68	45.05	58.31	93.79	307.05	790.69	
	14	12.52	14.30	23.25	33.73	48.33	67.13	120.39	156.68	253.80	838.33	2164.8	
350	8	9.18	9.63	11.34	12.56	14.15	16.32	24.23	30.82	49.01	158.38	406.19	
	10	10.57	11.33	14.16	16.49	20.06	25.84	45.05	58.31	93.79	307.05	790.69	
	14	13.44	15.25	23.75	33.78	48.33	67.13	120.39	156.68	253.80	838.33	2164.8	
400	8	9.77	10.24	12.00	13.25	14.83	16.96	24.47	30.86	49.01	158.38	406.19	
	10	11.26	12.05	14.92	17.21	20.63	26.08	45.05	58.31	93.79	307.05	790.69	
	14	14.31	16.14	24.33	33.88	48.34	67.13	120.39	156.68	253.80	838.33	2164.8	
450	8	10.33	10.82	12.63	13.90	15.50	17.59	24.77	30.95	49.01	158.38	406.19	
	10	11.92	12.72	15.64	17.92	21.23	26.40	45.06	58.31	93.79	307.05	790.69	
	14	15.14	16.99	24.96	34.05	48.34	67.13	120.39	156.68	253.80	838.33	2164.8	
500	8	10.87	11.37	13.24	14.53	16.14	18.22	25.13	31.07	49.02	158.38	406.19	
	10	12.54	13.37	16.33	18.61	21.83	26.78	45.06	58.31	93.79	307.05	790.69	
	14	15.92	17.80	25.61	34.28	48.35	67.13	120.39	156.68	253.80	838.33	2164.8	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.0 m (RADIUS = 9.2 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	11.39	11.90	13.82	15.13	16.75	18.82	25.53	31.25	49.02	158.38	406.19	
	10	13.14	13.99	17.00	19.27	22.45	27.21	45.08	58.31	93.79	307.05	790.69	
	14	16.68	18.57	26.28	34.58	48.38	67.13	120.39	156.68	253.80	838.33	2164.8	
600	8	11.88	12.41	14.38	15.71	17.35	19.42	25.96	31.47	49.02	158.38	406.19	
	10	13.72	14.58	17.65	19.92	23.05	27.67	45.11	58.32	93.79	307.05	790.69	
	14	17.41	19.32	26.95	34.93	48.42	67.13	120.39	156.68	253.80	838.33	2164.8	
650	8	12.36	12.90	14.91	16.27	17.93	20.00	26.41	31.74	49.03	158.38	406.19	
	10	14.28	15.16	18.27	20.55	23.65	28.15	45.15	58.32	93.79	307.05	790.69	
	14	18.11	20.05	27.61	35.33	48.48	67.13	120.39	156.68	253.80	838.33	2164.8	
700	8	12.83	13.38	15.43	16.81	18.49	20.56	26.87	32.04	49.05	158.38	406.19	
	10	14.82	15.71	18.87	21.17	24.25	28.64	45.21	58.32	93.79	307.05	790.69	
	14	18.79	20.75	28.28	35.76	48.57	67.13	120.39	156.68	253.80	838.33	2164.8	
750	8	13.28	13.84	15.94	17.34	19.03	21.12	27.35	32.36	49.08	158.38	406.19	
	10	15.34	16.25	19.46	21.77	24.83	29.15	45.30	58.33	93.79	307.05	790.69	
	14	19.44	21.43	28.93	36.22	48.69	67.14	120.39	156.68	253.80	838.33	2164.8	
800	8	13.72	14.29	16.43	17.86	19.57	21.66	27.82	32.72	49.12	158.38	406.19	
	10	15.85	16.78	20.03	22.36	25.41	29.66	45.41	58.34	93.79	307.05	790.69	
	14	20.08	22.09	29.58	36.70	48.84	67.15	120.39	156.68	253.80	838.33	2164.8	
850	8	14.14	14.73	16.91	18.36	20.08	22.19	28.30	33.09	49.17	158.38	406.19	
	10	16.34	17.29	20.59	22.93	25.98	30.17	45.55	58.36	93.79	307.05	790.69	
	14	20.71	22.73	30.23	37.20	49.02	67.16	120.39	156.68	253.80	838.33	2164.8	
900	8	14.56	15.16	17.38	18.84	20.59	22.71	28.78	33.47	49.24	158.38	406.19	
	10	16.83	17.79	21.13	23.49	26.54	30.69	45.72	58.39	93.79	307.05	790.69	
	14	21.32	23.36	30.86	37.71	49.24	67.18	120.39	156.68	253.80	838.33	2164.8	
950	8	14.97	15.58	17.83	19.32	21.09	23.22	29.26	33.87	49.33	158.38	406.19	
	10	17.30	18.27	21.66	24.03	27.09	31.20	45.91	58.43	93.79	307.05	790.69	
	14	21.91	23.98	31.48	38.23	49.48	67.21	120.39	156.68	253.80	838.33	2164.8	
1000	8	15.37	15.99	18.28	19.79	21.57	23.72	29.74	34.28	49.43	158.38	406.19	
	10	17.76	18.75	22.18	24.57	27.63	31.71	46.12	58.48	93.79	307.05	790.69	
	14	22.49	24.58	32.09	38.76	49.75	67.25	120.39	156.68	253.80	838.33	2164.8	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.0 m (RADIUS = 9.2 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2} 50	°C/min												
	8	10.87	22.24	64.68	97.91	141.50	197.52	356.34	464.56	754.32	2498.8	6458.3	
	10	17.70	41.50	124.35	189.19	274.27	383.60	693.65	904.95	1470.7	4877.4	12610.	
	14	44.80	110.34	337.58	515.40	748.72	1048.6	1899.1	2478.8	4031.0	13378.	34597.	
100	8	12.98	22.28	64.68	97.91	141.50	197.52	356.34	464.56	754.32	2498.8	6458.3	
	10	18.54	41.50	124.35	189.19	274.27	383.60	693.65	904.95	1470.7	4877.4	12610.	
	14	44.80	110.34	337.58	515.40	748.72	1048.6	1899.1	2478.8	4031.0	13378.	34597.	
150	8	14.90	22.66	64.68	97.91	141.50	197.52	356.34	464.56	754.32	2498.8	6458.3	
	10	20.13	41.50	124.35	189.19	274.27	383.60	693.65	904.95	1470.7	4877.4	12610.	
	14	44.81	110.34	337.58	515.40	748.72	1048.6	1899.1	2478.8	4031.0	13378.	34597.	
200	8	16.62	23.47	64.68	97.91	141.50	197.52	356.34	464.56	754.32	2498.8	6458.3	
	10	21.85	41.52	124.35	189.19	274.27	383.60	693.65	904.95	1470.7	4877.4	12610.	
	14	44.90	110.34	337.58	515.40	748.72	1048.6	1899.1	2478.8	4031.0	13378.	34597.	
250	8	18.19	24.51	64.68	97.91	141.50	197.52	356.34	464.56	754.32	2498.8	6458.3	
	10	23.51	41.60	124.35	189.19	274.27	383.60	693.65	904.95	1470.7	4877.4	12610.	
	14	45.18	110.34	337.58	515.40	748.72	1048.6	1899.1	2478.8	4031.0	13378.	34597.	
300	8	19.64	25.63	64.68	97.91	141.50	197.52	356.34	464.56	754.32	2498.8	6458.3	
	10	25.10	41.80	124.35	189.19	274.27	383.60	693.65	904.95	1470.7	4877.4	12610.	
	14	45.73	110.34	337.58	515.40	748.72	1048.6	1899.1	2478.8	4031.0	13378.	34597.	
350	8	20.99	26.78	64.69	97.91	141.50	197.52	356.34	464.56	754.32	2498.8	6458.3	
	10	26.61	42.16	124.35	189.19	274.27	383.60	693.65	904.95	1470.7	4877.4	12610.	
	14	46.52	110.34	337.58	515.40	748.72	1048.6	1899.1	2478.8	4031.0	13378.	34597.	
400	8	22.26	27.92	64.69	97.91	141.50	197.52	356.34	464.56	754.32	2498.8	6458.3	
	10	28.05	42.69	124.35	189.19	274.27	383.60	693.65	904.95	1470.7	4877.4	12610.	
	14	47.48	110.34	337.58	515.40	748.72	1048.6	1899.1	2478.8	4031.0	13378.	34597.	
450	8	23.47	29.04	64.69	97.91	141.50	197.52	356.34	464.56	754.32	2498.8	6458.3	
	10	29.43	43.33	124.35	189.19	274.27	383.60	693.65	904.95	1470.7	4877.4	12610.	
	14	48.56	110.34	337.58	515.40	748.72	1048.6	1899.1	2478.8	4031.0	13378.	34597.	
500	8	24.63	30.14	64.71	97.91	141.50	197.52	356.34	464.56	754.32	2498.8	6458.3	
	10	30.75	44.08	124.35	189.19	274.27	383.60	693.65	904.95	1470.7	4877.4	12610.	
	14	49.71	110.34	337.58	515.40	748.72	1048.6	1899.1	2478.8	4031.0	13378.	34597.	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.0 m (RADIUS = 9.2 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
(m*s) ^{1/2}	°C/min											
550	8	25.74	31.21	64.74	97.91	141.50	197.52	356.34	464.56	754.32	2498.8	6458.3
	10	32.02	44.89	124.35	189.19	274.27	383.60	693.65	904.95	1470.7	4877.4	12610.
	14	50.91	110.34	337.58	515.40	748.72	1048.6	1899.1	2478.8	4031.0	13378.	34597.
600	8	26.81	32.25	64.80	97.91	141.50	197.52	356.34	464.56	754.32	2498.8	6458.3
	10	33.25	45.75	124.35	189.19	274.27	383.60	693.65	904.95	1470.7	4877.4	12610.
	14	52.13	110.34	337.58	515.40	748.72	1048.6	1899.1	2478.8	4031.0	13378.	34597.
650	8	27.84	33.26	64.88	97.91	141.50	197.52	356.34	464.56	754.32	2498.8	6458.3
	10	34.44	46.63	124.35	189.19	274.27	383.60	693.65	904.95	1470.7	4877.4	12610.
	14	53.35	110.35	337.58	515.40	748.72	1048.6	1899.1	2478.8	4031.0	13378.	34597.
700	8	28.84	34.25	65.01	97.91	141.50	197.52	356.34	464.56	754.32	2498.8	6458.3
	10	35.59	47.54	124.35	189.19	274.27	383.60	693.65	904.95	1470.7	4877.4	12610.
	14	54.58	110.36	337.58	515.40	748.72	1048.6	1899.1	2478.8	4031.0	13378.	34597.
750	8	29.80	35.21	65.17	97.92	141.50	197.52	356.34	464.56	754.32	2498.8	6458.3
	10	36.72	48.45	124.35	189.19	274.27	383.60	693.65	904.95	1470.7	4877.4	12610.
	14	55.80	110.38	337.58	515.40	748.72	1048.6	1899.1	2478.8	4031.0	13378.	34597.
800	8	30.75	36.16	65.37	97.92	141.50	197.52	356.34	464.56	754.32	2498.8	6458.3
	10	37.81	49.37	124.35	189.19	274.27	383.60	693.65	904.95	1470.7	4877.4	12610.
	14	57.01	110.40	337.58	515.40	748.72	1048.6	1899.1	2478.8	4031.0	13378.	34597.
850	8	31.66	37.08	65.62	97.93	141.50	197.52	356.34	464.56	754.32	2498.8	6458.3
	10	38.87	50.29	124.35	189.19	274.27	383.60	693.65	904.95	1470.7	4877.4	12610.
	14	58.21	110.44	337.58	515.40	748.72	1048.6	1899.1	2478.8	4031.0	13378.	34597.
900	8	32.56	37.98	65.90	97.93	141.50	197.52	356.34	464.56	754.32	2498.8	6458.3
	10	39.91	51.21	124.35	189.19	274.27	383.60	693.65	904.95	1470.7	4877.4	12610.
	14	59.39	110.50	337.58	515.40	748.72	1048.6	1899.1	2478.8	4031.0	13378.	34597.
950	8	33.43	38.87	66.23	97.95	141.50	197.52	356.34	464.56	754.32	2498.8	6458.3
	10	40.93	52.12	124.36	189.19	274.27	383.60	693.65	904.95	1470.7	4877.4	12610.
	14	60.57	110.58	337.58	515.40	748.72	1048.6	1899.1	2478.8	4031.0	13378.	34597.
1000	8	34.28	39.73	66.59	97.97	141.50	197.52	356.34	464.56	754.32	2498.8	6458.3
	10	41.92	53.03	124.36	189.19	274.27	383.60	693.65	904.95	1470.7	4877.4	12610.
	14	61.72	110.68	337.58	515.40	748.72	1048.6	1899.1	2478.8	4031.0	13378.	34597.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.5 m (RADIUS = 9.5 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	1.51	1.48	1.54	1.60	1.66	1.72	1.86	1.94	2.09	2.66	3.53	
	10	1.60	1.57	1.65	1.71	1.78	1.86	2.02	2.11	2.30	3.09	4.89	
	14	1.76	1.74	1.85	1.93	2.03	2.13	2.36	2.50	2.82	4.92	10.57	
100	8	1.80	1.76	1.85	1.91	1.98	2.06	2.23	2.32	2.51	3.15	4.04	
	10	1.92	1.90	2.00	2.07	2.16	2.25	2.45	2.55	2.78	3.64	5.17	
	14	2.16	2.15	2.29	2.39	2.50	2.63	2.90	3.06	3.41	5.21	10.57	
150	8	2.02	1.99	2.09	2.16	2.25	2.33	2.52	2.62	2.83	3.55	4.50	
	10	2.19	2.16	2.28	2.37	2.46	2.57	2.79	2.91	3.16	4.10	5.59	
	14	2.49	2.47	2.64	2.76	2.89	3.02	3.33	3.51	3.89	5.66	10.58	
200	8	2.22	2.19	2.30	2.38	2.47	2.57	2.78	2.89	3.12	3.90	4.90	
	10	2.41	2.39	2.52	2.62	2.73	2.84	3.09	3.22	3.50	4.50	6.01	
	14	2.77	2.76	2.94	3.07	3.22	3.37	3.71	3.89	4.31	6.10	10.63	
250	8	2.40	2.37	2.49	2.58	2.68	2.78	3.01	3.13	3.37	4.21	5.26	
	10	2.62	2.59	2.74	2.85	2.96	3.09	3.35	3.49	3.79	4.86	6.41	
	14	3.02	3.01	3.22	3.36	3.51	3.68	4.04	4.24	4.68	6.52	10.76	
300	8	2.56	2.53	2.67	2.76	2.87	2.98	3.22	3.34	3.61	4.50	5.60	
	10	2.81	2.78	2.94	3.06	3.18	3.31	3.60	3.75	4.07	5.20	6.78	
	14	3.25	3.25	3.47	3.62	3.78	3.96	4.35	4.56	5.03	6.92	10.95	
350	8	2.72	2.69	2.83	2.93	3.04	3.16	3.41	3.55	3.83	4.76	5.91	
	10	2.98	2.96	3.13	3.25	3.38	3.52	3.82	3.98	4.32	5.51	7.14	
	14	3.47	3.47	3.70	3.86	4.04	4.23	4.64	4.86	5.35	7.30	11.20	
400	8	2.86	2.83	2.98	3.09	3.21	3.33	3.60	3.74	4.03	5.01	6.21	
	10	3.15	3.13	3.31	3.44	3.58	3.72	4.04	4.21	4.56	5.80	7.47	
	14	3.68	3.68	3.93	4.09	4.28	4.48	4.91	5.14	5.65	7.66	11.47	
450	8	3.00	2.97	3.13	3.24	3.37	3.50	3.78	3.92	4.23	5.25	6.49	
	10	3.31	3.29	3.48	3.61	3.76	3.91	4.24	4.42	4.79	6.08	7.79	
	14	3.87	3.87	4.14	4.31	4.51	4.71	5.16	5.41	5.94	8.00	11.76	
500	8	3.13	3.10	3.27	3.39	3.52	3.65	3.94	4.10	4.41	5.48	6.75	
	10	3.46	3.44	3.64	3.78	3.93	4.09	4.44	4.62	5.00	6.34	8.10	
	14	4.06	4.06	4.34	4.52	4.72	4.94	5.41	5.66	6.21	8.33	12.07	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.5 m (RADIUS = 9.5 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX		RATE OF RISE °C/min	CEILING HEIGHT, m									
			1	2	4	5	6	7	9	10	12	18
550	8	3.26	3.23	3.40	3.53	3.66	3.80	4.10	4.26	4.59	5.69	7.01
	10	3.61	3.59	3.80	3.94	4.10	4.27	4.62	4.81	5.21	6.59	8.40
	14	4.24	4.24	4.53	4.72	4.93	5.16	5.64	5.91	6.47	8.65	12.37
600	8	3.38	3.35	3.53	3.66	3.80	3.95	4.26	4.42	4.76	5.90	7.26
	10	3.75	3.73	3.95	4.10	4.26	4.43	4.80	5.00	5.41	6.84	8.68
	14	4.41	4.42	4.72	4.91	5.13	5.36	5.87	6.14	6.73	8.95	12.67
650	8	3.50	3.47	3.66	3.79	3.93	4.09	4.41	4.58	4.93	6.10	7.50
	10	3.88	3.86	4.09	4.24	4.41	4.59	4.98	5.18	5.61	7.07	8.96
	14	4.58	4.58	4.89	5.10	5.32	5.57	6.09	6.37	6.97	9.25	12.98
700	8	3.61	3.59	3.78	3.92	4.06	4.22	4.55	4.73	5.09	6.30	7.73
	10	4.01	4.00	4.23	4.39	4.56	4.75	5.14	5.35	5.79	7.30	9.23
	14	4.74	4.75	5.07	5.28	5.51	5.76	6.30	6.59	7.21	9.53	13.28
750	8	3.72	3.70	3.90	4.04	4.19	4.35	4.69	4.87	5.25	6.49	7.95
	10	4.14	4.12	4.37	4.53	4.71	4.90	5.31	5.52	5.97	7.52	9.49
	14	4.90	4.91	5.24	5.46	5.69	5.95	6.50	6.80	7.43	9.81	13.57
800	8	3.83	3.81	4.01	4.16	4.31	4.48	4.83	5.02	5.40	6.67	8.17
	10	4.26	4.25	4.50	4.67	4.85	5.05	5.47	5.69	6.15	7.74	9.74
	14	5.05	5.06	5.40	5.63	5.87	6.13	6.70	7.00	7.66	10.08	13.86
850	8	3.94	3.91	4.12	4.27	4.43	4.60	4.97	5.15	5.55	6.85	8.38
	10	4.38	4.37	4.63	4.80	4.99	5.19	5.62	5.85	6.32	7.95	9.99
	14	5.20	5.21	5.56	5.79	6.04	6.31	6.89	7.21	7.87	10.34	14.15
900	8	4.04	4.02	4.23	4.39	4.55	4.72	5.10	5.29	5.69	7.03	8.59
	10	4.50	4.49	4.75	4.93	5.13	5.33	5.77	6.00	6.49	8.15	10.23
	14	5.34	5.36	5.72	5.95	6.21	6.49	7.08	7.40	8.09	10.60	14.43
950	8	4.14	4.12	4.34	4.50	4.66	4.84	5.22	5.42	5.83	7.20	8.79
	10	4.62	4.60	4.87	5.06	5.26	5.47	5.92	6.16	6.66	8.35	10.46
	14	5.49	5.50	5.87	6.11	6.38	6.66	7.27	7.59	8.29	10.85	14.71
1000	8	4.24	4.22	4.44	4.60	4.78	4.96	5.35	5.55	5.97	7.36	8.99
	10	4.73	4.72	4.99	5.18	5.39	5.60	6.06	6.31	6.82	8.54	10.69
	14	5.63	5.64	6.02	6.27	6.54	6.83	7.45	7.78	8.49	11.10	14.99

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.5 m (RADIUS = 9.5 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	2.44	2.43	2.63	2.78	2.94	3.14	3.62	3.95	4.91	12.31	28.88
	10	2.65	2.67	2.95	3.15	3.40	3.71	4.66	5.43	7.82	22.27	54.39
	14	3.04	3.14	3.70	4.16	4.85	5.95	9.58	12.08	18.71	57.89	145.53
100	8	3.02	3.03	3.28	3.45	3.64	3.86	4.39	4.71	5.55	12.31	28.88
	10	3.32	3.35	3.69	3.93	4.21	4.53	5.40	6.01	7.95	22.27	54.39
	14	3.88	4.01	4.63	5.09	5.70	6.54	9.63	12.08	18.71	57.89	145.53
150	8	3.49	3.50	3.79	3.98	4.20	4.45	5.02	5.36	6.19	12.33	28.88
	10	3.86	3.91	4.29	4.56	4.86	5.21	6.09	6.67	8.36	22.27	54.39
	14	4.56	4.70	5.38	5.87	6.47	7.26	9.90	12.15	18.71	57.89	145.53
200	8	3.90	3.91	4.23	4.45	4.69	4.95	5.57	5.92	6.78	12.43	28.88
	10	4.33	4.38	4.81	5.10	5.43	5.80	6.71	7.29	8.88	22.27	54.39
	14	5.15	5.31	6.04	6.55	7.17	7.94	10.36	12.36	18.71	57.89	145.53
250	8	4.26	4.29	4.63	4.87	5.12	5.41	6.06	6.43	7.32	12.64	28.88
	10	4.75	4.81	5.28	5.59	5.93	6.33	7.28	7.87	9.41	22.27	54.39
	14	5.67	5.85	6.63	7.16	7.80	8.58	10.88	12.71	18.74	57.89	145.53
300	8	4.60	4.63	5.00	5.25	5.52	5.83	6.51	6.90	7.82	12.94	28.89
	10	5.14	5.21	5.71	6.03	6.40	6.81	7.80	8.40	9.94	22.28	54.39
	14	6.16	6.34	7.17	7.72	8.38	9.18	11.43	13.13	18.81	57.89	145.53
350	8	4.92	4.95	5.34	5.61	5.90	6.22	6.93	7.34	8.28	13.29	28.89
	10	5.50	5.58	6.10	6.45	6.84	7.27	8.29	8.90	10.44	22.30	54.39
	14	6.61	6.80	7.67	8.25	8.93	9.74	11.96	13.60	18.94	57.89	145.53
400	8	5.21	5.25	5.67	5.94	6.25	6.58	7.33	7.75	8.72	13.67	28.89
	10	5.85	5.93	6.48	6.84	7.25	7.70	8.75	9.38	10.93	22.35	54.39
	14	7.04	7.24	8.14	8.74	9.44	10.27	12.49	14.07	19.14	57.89	145.53
450	8	5.49	5.53	5.97	6.26	6.58	6.93	7.71	8.15	9.14	14.06	28.89
	10	6.17	6.26	6.84	7.21	7.63	8.10	9.19	9.83	11.40	22.43	54.39
	14	7.44	7.65	8.59	9.21	9.93	10.77	13.00	14.55	19.39	57.89	145.53
500	8	5.76	5.80	6.26	6.57	6.90	7.26	8.07	8.52	9.54	14.46	28.90
	10	6.48	6.57	7.17	7.57	8.00	8.49	9.61	10.26	11.85	22.54	54.39
	14	7.83	8.05	9.02	9.66	10.40	11.25	13.49	15.03	19.69	57.89	145.53

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.5 m (RADIUS = 9.5 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
(m*s) ^{1/2}	°C/min												
550	8	6.02	6.07	6.54	6.86	7.20	7.58	8.41	8.88	9.93	14.85	28.93	
	10	6.78	6.87	7.50	7.91	8.36	8.86	10.01	10.68	12.29	22.70	54.39	
	14	8.20	8.42	9.43	10.09	10.84	11.72	13.98	15.49	20.02	57.89	145.53	
600	8	6.27	6.32	6.81	7.14	7.50	7.88	8.74	9.22	10.30	15.24	28.96	
	10	7.07	7.17	7.81	8.23	8.70	9.21	10.39	11.08	12.71	22.88	54.39	
	14	8.55	8.79	9.82	10.50	11.27	12.17	14.44	15.95	20.36	57.89	145.53	
650	8	6.51	6.56	7.07	7.41	7.78	8.18	9.06	9.55	10.66	15.63	29.01	
	10	7.34	7.45	8.12	8.55	9.03	9.56	10.77	11.47	13.12	23.10	54.39	
	14	8.90	9.14	10.21	10.90	11.69	12.60	14.90	16.40	20.73	57.89	145.53	
700	8	6.75	6.80	7.33	7.67	8.05	8.46	9.37	9.88	11.00	16.01	29.08	
	10	7.61	7.72	8.41	8.86	9.35	9.89	11.13	11.84	13.52	23.34	54.39	
	14	9.23	9.48	10.57	11.28	12.09	13.02	15.34	16.85	21.10	57.89	145.53	
750	8	6.97	7.03	7.57	7.93	8.32	8.74	9.67	10.19	11.34	16.39	29.17	
	10	7.87	7.98	8.69	9.15	9.66	10.21	11.48	12.20	13.90	23.60	54.39	
	14	9.56	9.81	10.93	11.66	12.48	13.42	15.77	17.28	21.48	57.89	145.53	
800	8	7.19	7.25	7.81	8.18	8.58	9.01	9.96	10.49	11.66	16.76	29.29	
	10	8.13	8.24	8.97	9.44	9.96	10.53	11.82	12.56	14.28	23.88	54.39	
	14	9.87	10.13	11.28	12.02	12.86	13.82	16.19	17.70	21.86	57.89	145.53	
850	8	7.41	7.47	8.04	8.42	8.83	9.27	10.25	10.79	11.98	17.12	29.42	
	10	8.38	8.49	9.24	9.72	10.25	10.83	12.15	12.90	14.65	24.17	54.39	
	14	10.18	10.45	11.62	12.37	13.23	14.20	16.60	18.12	22.25	57.89	145.53	
900	8	7.62	7.68	8.27	8.65	9.07	9.53	10.53	11.08	12.29	17.48	29.57	
	10	8.62	8.74	9.50	10.00	10.54	11.13	12.48	13.24	15.01	24.47	54.39	
	14	10.48	10.75	11.95	12.72	13.59	14.58	17.00	18.53	22.63	57.89	145.53	
950	8	7.82	7.89	8.49	8.88	9.31	9.78	10.80	11.36	12.60	17.83	29.73	
	10	8.85	8.98	9.76	10.26	10.82	11.42	12.79	13.57	15.36	24.77	54.39	
	14	10.77	11.05	12.27	13.06	13.95	14.95	17.40	18.93	23.01	57.89	145.53	
1000	8	8.02	8.09	8.71	9.11	9.55	10.02	11.06	11.63	12.89	18.18	29.92	
	10	9.08	9.21	10.01	10.53	11.09	11.71	13.10	13.89	15.70	25.08	54.39	
	14	11.06	11.34	12.59	13.39	14.29	15.31	17.78	19.32	23.39	57.89	145.53	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.5 m (RADIUS = 9.5 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	4.39	4.71	6.43	8.42	11.42	15.31	26.23	33.61	53.23	169.74	430.93	
	10	5.00	5.69	10.25	14.77	20.68	28.22	49.43	63.78	101.99	329.20	838.99	
	14	6.52	9.47	25.27	37.63	53.75	74.35	132.34	171.62	276.26	899.05	2297.3	
100	8	5.62	5.98	7.56	9.05	11.55	15.32	26.23	33.61	53.23	169.74	430.93	
	10	6.45	7.13	10.66	14.79	20.68	28.22	49.43	63.78	101.99	329.20	838.99	
	14	8.31	10.56	25.27	37.63	53.75	74.35	132.34	171.62	276.26	899.05	2297.3	
150	8	6.61	7.00	8.60	9.95	12.05	15.42	26.23	33.61	53.23	169.74	430.93	
	10	7.60	8.32	11.51	15.02	20.69	28.22	49.43	63.78	101.99	329.20	838.99	
	14	9.76	11.83	25.27	37.63	53.75	74.35	132.34	171.62	276.26	899.05	2297.3	
200	8	7.47	7.88	9.54	10.84	12.75	15.73	26.23	33.61	53.23	169.74	430.93	
	10	8.60	9.34	12.43	15.52	20.76	28.22	49.43	63.78	101.99	329.20	838.99	
	14	11.02	13.03	25.31	37.63	53.75	74.35	132.34	171.62	276.26	899.05	2297.3	
250	8	8.24	8.68	10.38	11.68	13.50	16.21	26.24	33.61	53.23	169.74	430.93	
	10	9.50	10.27	13.32	16.17	20.96	28.23	49.43	63.78	101.99	329.20	838.99	
	14	12.15	14.15	25.44	37.63	53.75	74.35	132.34	171.62	276.26	899.05	2297.3	
300	8	8.95	9.41	11.17	12.48	14.24	16.78	26.29	33.61	53.23	169.74	430.93	
	10	10.32	11.12	14.18	16.88	21.29	28.28	49.43	63.78	101.99	329.20	838.99	
	14	13.19	15.19	25.71	37.64	53.75	74.35	132.34	171.62	276.26	899.05	2297.3	
350	8	9.61	10.08	11.90	13.23	14.97	17.40	26.39	33.62	53.23	169.74	430.93	
	10	11.09	11.91	15.00	17.61	21.74	28.38	49.43	63.78	101.99	329.20	838.99	
	14	14.16	16.17	26.11	37.66	53.75	74.35	132.34	171.62	276.26	899.05	2297.3	
400	8	10.23	10.72	12.60	13.94	15.67	18.03	26.56	33.64	53.23	169.74	430.93	
	10	11.81	12.66	15.78	18.34	22.26	28.55	49.43	63.78	101.99	329.20	838.99	
	14	15.07	17.10	26.60	37.71	53.75	74.35	132.34	171.62	276.26	899.05	2297.3	
450	8	10.82	11.33	13.26	14.61	16.35	18.67	26.80	33.70	53.23	169.74	430.93	
	10	12.50	13.36	16.53	19.05	22.82	28.79	49.43	63.78	101.99	329.20	838.99	
	14	15.94	17.98	27.17	37.81	53.75	74.35	132.34	171.62	276.26	899.05	2297.3	
500	8	11.38	11.91	13.88	15.26	17.00	19.29	27.10	33.78	53.23	169.74	430.93	
	10	13.15	14.04	17.24	19.75	23.40	29.10	49.43	63.78	101.99	329.20	838.99	
	14	16.76	18.83	27.77	37.96	53.75	74.35	132.34	171.62	276.26	899.05	2297.3	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.5 m (RADIUS = 9.5 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	11.92	12.46	14.49	15.89	17.64	19.91	27.45	33.91	53.23	169.74	430.93	
	10	13.78	14.69	17.93	20.43	24.00	29.47	49.44	63.78	101.99	329.20	838.99	
	14	17.55	19.64	28.41	38.17	53.76	74.35	132.34	171.62	276.26	899.05	2297.3	
600	8	12.44	12.99	15.07	16.49	18.25	20.51	27.84	34.07	53.24	169.74	430.93	
	10	14.39	15.31	18.60	21.10	24.60	29.88	49.45	63.78	101.99	329.20	838.99	
	14	18.31	20.42	29.06	38.44	53.78	74.35	132.34	171.62	276.26	899.05	2297.3	
650	8	12.94	13.51	15.63	17.07	18.85	21.10	28.26	34.29	53.24	169.74	430.93	
	10	14.97	15.91	19.25	21.75	25.20	30.32	49.48	63.78	101.99	329.20	838.99	
	14	19.05	21.17	29.71	38.76	53.81	74.35	132.34	171.62	276.26	899.05	2297.3	
700	8	13.43	14.01	16.17	17.64	19.43	21.68	28.70	34.53	53.25	169.74	430.93	
	10	15.53	16.49	19.88	22.38	25.80	30.78	49.51	63.79	101.99	329.20	838.99	
	14	19.76	21.90	30.37	39.12	53.86	74.35	132.34	171.62	276.26	899.05	2297.3	
750	8	13.90	14.49	16.70	18.18	19.99	22.25	29.15	34.81	53.26	169.74	430.93	
	10	16.08	17.05	20.48	23.00	26.39	31.26	49.57	63.79	101.99	329.20	838.99	
	14	20.45	22.62	31.03	39.52	53.93	74.35	132.34	171.62	276.26	899.05	2297.3	
800	8	14.36	14.96	17.21	18.72	20.54	22.80	29.61	35.13	53.29	169.74	430.93	
	10	16.61	17.60	21.08	23.60	26.97	31.75	49.64	63.80	101.99	329.20	838.99	
	14	21.12	23.31	31.68	39.95	54.03	74.35	132.34	171.62	276.26	899.05	2297.3	
850	8	14.81	15.42	17.71	19.24	21.08	23.35	30.08	35.46	53.32	169.74	430.93	
	10	17.13	18.14	21.66	24.19	27.55	32.25	49.73	63.81	101.99	329.20	838.99	
	14	21.77	23.98	32.33	40.40	54.15	74.36	132.34	171.62	276.26	899.05	2297.3	
900	8	15.24	15.87	18.19	19.74	21.60	23.88	30.55	35.81	53.36	169.74	430.93	
	10	17.64	18.66	22.22	24.77	28.12	32.76	49.85	63.82	101.99	329.20	838.99	
	14	22.41	24.64	32.96	40.88	54.29	74.37	132.34	171.62	276.26	899.05	2297.3	
950	8	15.67	16.30	18.67	20.24	22.12	24.40	31.03	36.18	53.42	169.74	430.93	
	10	18.13	19.17	22.77	25.34	28.68	33.26	49.99	63.84	101.99	329.20	838.99	
	14	23.03	25.28	33.60	41.36	54.47	74.38	132.34	171.62	276.26	899.05	2297.3	
1000	8	16.09	16.73	19.13	20.72	22.62	24.92	31.50	36.57	53.49	169.74	430.93	
	10	18.62	19.66	23.31	25.89	29.23	33.77	50.15	63.87	102.00	329.20	838.99	
	14	23.64	25.91	34.22	41.86	54.67	74.40	132.34	171.62	276.26	899.05	2297.3	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.5 m (RADIUS = 9.5 m)
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE RATE
TIME INDEX OF RISE

CEILING HEIGHT, m

(m*s)^{1/2}

°C/min

1

2

4

5

6

7

9

10

12

18

24

50	8	11.94	25.20	72.73	109.56	157.60	219.01	391.94	509.13	821.30	2679.9	6853.8
	10	20.13	47.22	140.02	211.90	305.65	425.52	763.13	991.93	1601.5	5231.2	13383.
	14	51.38	125.91	380.47	577.62	834.76	1163.6	2089.7	2717.4	4389.8	14349.	36716.
100	8	13.97	25.21	72.73	109.56	157.60	219.01	391.94	509.13	821.30	2679.9	6853.8
	10	20.67	47.22	140.02	211.90	305.65	425.52	763.13	991.93	1601.5	5231.2	13383.
	14	51.38	125.91	380.47	577.62	834.76	1163.6	2089.7	2717.4	4389.8	14349.	36716.
150	8	15.94	25.42	72.73	109.56	157.60	219.01	391.94	509.13	821.30	2679.9	6853.8
	10	22.07	47.22	140.02	211.90	305.65	425.52	763.13	991.93	1601.5	5231.2	13383.
	14	51.38	125.91	380.47	577.62	834.76	1163.6	2089.7	2717.4	4389.8	14349.	36716.
200	8	17.72	26.02	72.73	109.56	157.60	219.01	391.94	509.13	821.30	2679.9	6853.8
	10	23.72	47.22	140.02	211.90	305.65	425.52	763.13	991.93	1601.5	5231.2	13383.
	14	51.41	125.91	380.47	577.62	834.76	1163.6	2089.7	2717.4	4389.8	14349.	36716.
250	8	19.35	26.92	72.73	109.56	157.60	219.01	391.94	509.13	821.30	2679.9	6853.8
	10	25.39	47.25	140.02	211.90	305.65	425.52	763.13	991.93	1601.5	5231.2	13383.
	14	51.54	125.91	380.47	577.62	834.76	1163.6	2089.7	2717.4	4389.8	14349.	36716.
300	8	20.86	27.96	72.73	109.56	157.60	219.01	391.94	509.13	821.30	2679.9	6853.8
	10	27.00	47.35	140.02	211.90	305.65	425.52	763.13	991.93	1601.5	5231.2	13383.
	14	51.86	125.91	380.47	577.62	834.76	1163.6	2089.7	2717.4	4389.8	14349.	36716.
350	8	22.27	29.07	72.73	109.56	157.60	219.01	391.94	509.13	821.30	2679.9	6853.8
	10	28.55	47.56	140.02	211.90	305.65	425.52	763.13	991.93	1601.5	5231.2	13383.
	14	52.40	125.91	380.47	577.62	834.76	1163.6	2089.7	2717.4	4389.8	14349.	36716.
400	8	23.60	30.19	72.73	109.56	157.60	219.01	391.94	509.13	821.30	2679.9	6853.8
	10	30.04	47.90	140.02	211.90	305.65	425.52	763.13	991.93	1601.5	5231.2	13383.
	14	53.14	125.91	380.47	577.62	834.76	1163.6	2089.7	2717.4	4389.8	14349.	36716.
450	8	24.87	31.31	72.73	109.56	157.60	219.01	391.94	509.13	821.30	2679.9	6853.8
	10	31.46	48.38	140.02	211.90	305.65	425.52	763.13	991.93	1601.5	5231.2	13383.
	14	54.03	125.91	380.47	577.62	834.76	1163.6	2089.7	2717.4	4389.8	14349.	36716.
500	8	26.08	32.42	72.74	109.56	157.60	219.01	391.94	509.13	821.30	2679.9	6853.8
	10	32.83	48.97	140.02	211.90	305.65	425.52	763.13	991.93	1601.5	5231.2	13383.
	14	55.04	125.91	380.47	577.62	834.76	1163.6	2089.7	2717.4	4389.8	14349.	36716.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 13.5 m (RADIUS = 9.5 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	27.24	33.50	72.75	109.56	157.60	219.01	391.94	509.13	821.30	2679.9	6853.8
	10	34.16	49.66	140.02	211.90	305.65	425.52	763.13	991.93	1601.5	5231.2	13383.
	14	56.13	125.91	380.47	577.62	834.76	1163.6	2089.7	2717.4	4389.8	14349.	36716.
600	8	28.36	34.56	72.77	109.56	157.60	219.01	391.94	509.13	821.30	2679.9	6853.8
	10	35.44	50.41	140.02	211.90	305.65	425.52	763.13	991.93	1601.5	5231.2	13383.
	14	57.27	125.91	380.47	577.62	834.76	1163.6	2089.7	2717.4	4389.8	14349.	36716.
650	8	29.43	35.60	72.82	109.56	157.60	219.01	391.94	509.13	821.30	2679.9	6853.8
	10	36.68	51.21	140.02	211.90	305.65	425.52	763.13	991.93	1601.5	5231.2	13383.
	14	58.44	125.91	380.47	577.62	834.76	1163.6	2089.7	2717.4	4389.8	14349.	36716.
700	8	30.48	36.62	72.88	109.56	157.60	219.01	391.94	509.13	821.30	2679.9	6853.8
	10	37.88	52.06	140.02	211.90	305.65	425.52	763.13	991.93	1601.5	5231.2	13383.
	14	59.63	125.91	380.47	577.62	834.76	1163.6	2089.7	2717.4	4389.8	14349.	36716.
750	8	31.49	37.61	72.96	109.56	157.60	219.01	391.94	509.13	821.30	2679.9	6853.8
	10	39.05	52.92	140.02	211.90	305.65	425.52	763.13	991.93	1601.5	5231.2	13383.
	14	60.83	125.92	380.47	577.62	834.76	1163.6	2089.7	2717.4	4389.8	14349.	36716.
800	8	32.48	38.59	73.09	109.57	157.60	219.01	391.94	509.13	821.30	2679.9	6853.8
	10	40.19	53.80	140.02	211.90	305.65	425.52	763.13	991.93	1601.5	5231.2	13383.
	14	62.02	125.93	380.47	577.62	834.76	1163.6	2089.7	2717.4	4389.8	14349.	36716.
850	8	33.44	39.54	73.24	109.57	157.60	219.01	391.94	509.13	821.30	2679.9	6853.8
	10	41.30	54.70	140.02	211.90	305.65	425.52	763.13	991.93	1601.5	5231.2	13383.
	14	63.22	125.94	380.47	577.62	834.76	1163.6	2089.7	2717.4	4389.8	14349.	36716.
900	8	34.38	40.47	73.43	109.57	157.60	219.01	391.94	509.13	821.30	2679.9	6853.8
	10	42.39	55.60	140.02	211.90	305.65	425.52	763.13	991.93	1601.5	5231.2	13383.
	14	64.41	125.96	380.47	577.62	834.76	1163.6	2089.7	2717.4	4389.8	14349.	36716.
950	8	35.29	41.39	73.65	109.57	157.60	219.01	391.94	509.13	821.30	2679.9	6853.8
	10	43.45	56.50	140.02	211.90	305.65	425.52	763.13	991.93	1601.5	5231.2	13383.
	14	65.59	125.99	380.47	577.62	834.76	1163.6	2089.7	2717.4	4389.8	14349.	36716.
1000	8	36.19	42.29	73.91	109.58	157.60	219.01	391.94	509.13	821.30	2679.9	6853.8
	10	44.49	57.40	140.02	211.90	305.65	425.52	763.13	991.93	1601.5	5231.2	13383.
	14	66.76	126.04	380.47	577.62	834.76	1163.6	2089.7	2717.4	4389.8	14349.	36716.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 m (RADIUS = 9.9 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	1.57	1.53	1.59	1.65	1.71	1.77	1.91	1.99	2.15	2.72	3.63	
	10	1.66	1.63	1.70	1.76	1.83	1.91	2.08	2.17	2.36	3.18	5.10	
	14	1.83	1.81	1.92	2.00	2.09	2.20	2.44	2.58	2.92	5.18	11.13	
100	8	1.86	1.83	1.91	1.97	2.04	2.12	2.29	2.38	2.57	3.23	4.14	
	10	2.00	1.97	2.06	2.14	2.23	2.32	2.52	2.63	2.86	3.74	5.36	
	14	2.25	2.23	2.37	2.47	2.59	2.71	3.00	3.16	3.52	5.44	11.13	
150	8	2.10	2.06	2.16	2.23	2.31	2.40	2.59	2.69	2.91	3.64	4.61	
	10	2.27	2.24	2.36	2.44	2.54	2.64	2.87	2.99	3.25	4.21	5.77	
	14	2.59	2.57	2.74	2.85	2.98	3.13	3.44	3.62	4.01	5.87	11.14	
200	8	2.31	2.27	2.38	2.46	2.55	2.65	2.86	2.97	3.20	3.99	5.02	
	10	2.51	2.48	2.61	2.71	2.81	2.93	3.18	3.31	3.59	4.62	6.19	
	14	2.88	2.87	3.05	3.18	3.33	3.48	3.83	4.02	4.44	6.32	11.17	
250	8	2.49	2.46	2.57	2.66	2.76	2.87	3.09	3.21	3.46	4.31	5.39	
	10	2.72	2.69	2.84	2.94	3.06	3.18	3.45	3.59	3.90	4.99	6.59	
	14	3.14	3.13	3.34	3.48	3.63	3.80	4.17	4.38	4.83	6.75	11.28	
300	8	2.67	2.63	2.76	2.85	2.96	3.07	3.31	3.44	3.70	4.61	5.73	
	10	2.92	2.89	3.05	3.16	3.28	3.42	3.70	3.86	4.18	5.34	6.97	
	14	3.39	3.38	3.60	3.75	3.92	4.10	4.49	4.71	5.19	7.15	11.45	
350	8	2.83	2.79	2.93	3.03	3.14	3.26	3.51	3.65	3.93	4.88	6.05	
	10	3.10	3.08	3.24	3.36	3.50	3.64	3.94	4.10	4.44	5.65	7.33	
	14	3.61	3.61	3.84	4.00	4.18	4.37	4.79	5.02	5.52	7.54	11.68	
400	8	2.98	2.94	3.09	3.19	3.31	3.44	3.70	3.85	4.14	5.13	6.35	
	10	3.28	3.25	3.43	3.55	3.69	3.84	4.16	4.33	4.69	5.95	7.67	
	14	3.83	3.82	4.07	4.24	4.43	4.63	5.07	5.31	5.83	7.91	11.94	
450	8	3.12	3.09	3.24	3.35	3.47	3.61	3.89	4.03	4.34	5.38	6.64	
	10	3.44	3.42	3.60	3.74	3.88	4.04	4.37	4.55	4.92	6.24	8.00	
	14	4.03	4.03	4.29	4.47	4.66	4.87	5.33	5.58	6.12	8.26	12.23	
500	8	3.26	3.22	3.38	3.50	3.63	3.77	4.06	4.21	4.53	5.61	6.91	
	10	3.60	3.57	3.77	3.91	4.06	4.22	4.57	4.76	5.15	6.51	8.32	
	14	4.23	4.22	4.50	4.68	4.89	5.11	5.58	5.84	6.41	8.59	12.52	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 m (RADIUS = 9.9 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	3.39	3.36	3.52	3.65	3.78	3.92	4.23	4.39	4.72	5.83	7.18
	10	3.75	3.73	3.93	4.08	4.23	4.40	4.77	4.96	5.36	6.77	8.62
	14	4.41	4.41	4.70	4.89	5.10	5.33	5.83	6.10	6.68	8.92	12.82
600	8	3.52	3.48	3.66	3.78	3.92	4.07	4.39	4.55	4.90	6.05	7.43
	10	3.90	3.87	4.09	4.24	4.40	4.58	4.95	5.15	5.57	7.02	8.91
	14	4.59	4.59	4.89	5.09	5.31	5.55	6.06	6.34	6.94	9.23	13.13
650	8	3.64	3.61	3.79	3.92	4.06	4.22	4.54	4.71	5.07	6.25	7.67
	10	4.04	4.02	4.24	4.39	4.56	4.74	5.13	5.34	5.77	7.26	9.19
	14	4.77	4.77	5.08	5.28	5.51	5.75	6.28	6.57	7.19	9.53	13.43
700	8	3.76	3.73	3.91	4.05	4.20	4.35	4.69	4.87	5.23	6.45	7.91
	10	4.18	4.15	4.38	4.54	4.72	4.90	5.30	5.51	5.96	7.49	9.47
	14	4.94	4.94	5.26	5.47	5.71	5.96	6.50	6.80	7.43	9.82	13.73
750	8	3.88	3.84	4.04	4.18	4.33	4.49	4.84	5.02	5.39	6.65	8.14
	10	4.31	4.29	4.52	4.69	4.87	5.06	5.47	5.69	6.15	7.72	9.73
	14	5.10	5.10	5.43	5.65	5.89	6.15	6.71	7.02	7.67	10.11	14.03
800	8	3.99	3.95	4.16	4.30	4.46	4.62	4.98	5.16	5.55	6.84	8.36
	10	4.44	4.42	4.66	4.83	5.02	5.21	5.64	5.86	6.33	7.94	9.99
	14	5.26	5.26	5.60	5.83	6.08	6.34	6.92	7.23	7.90	10.38	14.32
850	8	4.10	4.06	4.27	4.42	4.58	4.75	5.11	5.31	5.70	7.02	8.58
	10	4.56	4.54	4.79	4.97	5.16	5.36	5.80	6.02	6.51	8.16	10.24
	14	5.42	5.42	5.77	6.00	6.26	6.53	7.12	7.44	8.12	10.65	14.61
900	8	4.21	4.17	4.38	4.54	4.70	4.88	5.25	5.44	5.85	7.20	8.79
	10	4.69	4.67	4.92	5.10	5.30	5.51	5.95	6.19	6.68	8.36	10.49
	14	5.57	5.57	5.93	6.17	6.43	6.71	7.31	7.64	8.34	10.92	14.90
950	8	4.31	4.28	4.50	4.65	4.82	5.00	5.38	5.58	6.00	7.38	9.00
	10	4.81	4.79	5.05	5.23	5.44	5.65	6.10	6.34	6.85	8.57	10.73
	14	5.72	5.72	6.09	6.33	6.60	6.89	7.50	7.84	8.55	11.17	15.18
1000	8	4.41	4.38	4.60	4.76	4.94	5.12	5.51	5.71	6.14	7.55	9.20
	10	4.93	4.90	5.18	5.36	5.57	5.79	6.25	6.50	7.01	8.77	10.97
	14	5.86	5.87	6.24	6.49	6.77	7.06	7.69	8.03	8.76	11.43	15.46

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 m (RADIUS = 9.9 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	2.54	2.53	2.73	2.88	3.05	3.25	3.77	4.12	5.19	13.08	30.52	
	10	2.75	2.77	3.06	3.28	3.54	3.88	4.93	5.79	8.38	23.75	57.56	
	14	3.17	3.28	3.88	4.40	5.18	6.43	10.41	13.11	20.22	61.91	154.21	
100	8	3.15	3.15	3.40	3.57	3.78	4.00	4.56	4.90	5.80	13.08	30.52	
	10	3.46	3.49	3.84	4.09	4.38	4.72	5.65	6.32	8.48	23.75	57.56	
	14	4.05	4.19	4.85	5.34	6.01	6.95	10.44	13.11	20.22	61.91	154.21	
150	8	3.63	3.64	3.93	4.13	4.36	4.61	5.20	5.56	6.44	13.09	30.52	
	10	4.02	4.07	4.46	4.74	5.05	5.42	6.36	6.98	8.84	23.75	57.56	
	14	4.76	4.91	5.63	6.14	6.80	7.66	10.64	13.14	20.22	61.91	154.21	
200	8	4.06	4.07	4.39	4.61	4.86	5.13	5.77	6.14	7.04	13.16	30.52	
	10	4.51	4.56	5.00	5.30	5.64	6.03	6.99	7.61	9.33	23.75	57.56	
	14	5.37	5.54	6.31	6.85	7.51	8.35	11.04	13.30	20.23	61.91	154.21	
250	8	4.44	4.46	4.81	5.05	5.31	5.60	6.28	6.67	7.59	13.34	30.52	
	10	4.95	5.01	5.49	5.81	6.17	6.58	7.57	8.20	9.86	23.75	57.56	
	14	5.92	6.10	6.92	7.48	8.16	9.00	11.54	13.59	20.24	61.91	154.21	
300	8	4.79	4.81	5.19	5.44	5.73	6.04	6.74	7.15	8.10	13.61	30.52	
	10	5.36	5.43	5.93	6.27	6.65	7.08	8.11	8.75	10.39	23.76	57.56	
	14	6.43	6.62	7.48	8.06	8.76	9.61	12.07	13.98	20.29	61.91	154.21	
350	8	5.12	5.15	5.55	5.81	6.11	6.44	7.18	7.60	8.58	13.94	30.52	
	10	5.74	5.81	6.35	6.70	7.10	7.55	8.62	9.26	10.90	23.77	57.56	
	14	6.90	7.10	8.00	8.61	9.33	10.19	12.61	14.42	20.38	61.91	154.21	
400	8	5.43	5.46	5.88	6.16	6.48	6.82	7.59	8.03	9.03	14.30	30.52	
	10	6.09	6.17	6.74	7.11	7.53	7.99	9.09	9.75	11.40	23.80	57.56	
	14	7.35	7.55	8.49	9.12	9.86	10.74	13.14	14.88	20.54	61.91	154.21	
450	8	5.72	5.76	6.20	6.49	6.82	7.18	7.98	8.43	9.47	14.68	30.53	
	10	6.43	6.52	7.11	7.49	7.93	8.41	9.54	10.22	11.88	23.86	57.56	
	14	7.77	7.99	8.96	9.61	10.37	11.26	13.66	15.35	20.75	61.91	154.21	
500	8	6.01	6.04	6.50	6.81	7.15	7.52	8.35	8.82	9.88	15.07	30.53	
	10	6.76	6.85	7.46	7.86	8.31	8.81	9.98	10.66	12.34	23.95	57.56	
	14	8.17	8.40	9.41	10.07	10.85	11.76	14.16	15.83	21.01	61.91	154.21	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 m (RADIUS = 9.9 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	6.28	6.31	6.80	7.11	7.47	7.85	8.71	9.19	10.27	15.47	30.55	
	10	7.07	7.16	7.80	8.22	8.68	9.20	10.39	11.09	12.78	24.07	57.56	
	14	8.56	8.79	9.83	10.52	11.31	12.24	14.65	16.30	21.30	61.91	154.21	
600	8	6.54	6.58	7.08	7.41	7.77	8.17	9.05	9.54	10.65	15.86	30.57	
	10	7.37	7.46	8.12	8.55	9.04	9.56	10.79	11.50	13.22	24.23	57.56	
	14	8.93	9.17	10.24	10.95	11.76	12.70	15.13	16.76	21.62	61.91	154.21	
650	8	6.79	6.83	7.35	7.69	8.06	8.47	9.38	9.89	11.02	16.25	30.61	
	10	7.66	7.76	8.44	8.88	9.38	9.92	11.17	11.90	13.64	24.42	57.56	
	14	9.29	9.54	10.64	11.36	12.19	13.15	15.59	17.22	21.97	61.91	154.21	
700	8	7.03	7.07	7.61	7.96	8.35	8.77	9.70	10.22	11.38	16.64	30.67	
	10	7.94	8.04	8.74	9.20	9.71	10.27	11.55	12.29	14.04	24.64	57.56	
	14	9.64	9.89	11.02	11.76	12.61	13.58	16.05	17.67	22.33	61.91	154.21	
750	8	7.27	7.31	7.86	8.22	8.62	9.05	10.01	10.54	11.73	17.02	30.74	
	10	8.21	8.32	9.04	9.51	10.03	10.60	11.91	12.66	14.44	24.88	57.56	
	14	9.98	10.24	11.40	12.15	13.01	14.00	16.49	18.11	22.69	61.91	154.21	
800	8	7.50	7.55	8.11	8.48	8.89	9.33	10.31	10.85	12.06	17.39	30.83	
	10	8.48	8.58	9.33	9.81	10.34	10.93	12.26	13.03	14.83	25.13	57.56	
	14	10.31	10.57	11.76	12.53	13.41	14.41	16.92	18.54	23.07	61.91	154.21	
850	8	7.72	7.77	8.35	8.73	9.15	9.60	10.60	11.16	12.39	17.76	30.94	
	10	8.73	8.85	9.61	10.10	10.64	11.24	12.60	13.38	15.21	25.41	57.56	
	14	10.63	10.90	12.11	12.89	13.79	14.81	17.34	18.96	23.45	61.91	154.21	
900	8	7.94	7.99	8.59	8.98	9.41	9.87	10.89	11.46	12.71	18.12	31.08	
	10	8.99	9.10	9.88	10.38	10.94	11.55	12.94	13.73	15.58	25.69	57.57	
	14	10.94	11.22	12.45	13.25	14.16	15.20	17.76	19.38	23.82	61.91	154.21	
950	8	8.15	8.21	8.82	9.22	9.65	10.13	11.17	11.75	13.02	18.48	31.22	
	10	9.23	9.35	10.15	10.66	11.23	11.85	13.27	14.07	15.94	25.98	57.57	
	14	11.25	11.53	12.79	13.60	14.53	15.58	18.16	19.79	24.20	61.91	154.21	
1000	8	8.36	8.42	9.04	9.45	9.90	10.38	11.44	12.03	13.33	18.83	31.39	
	10	9.48	9.59	10.41	10.93	11.51	12.15	13.58	14.40	16.29	26.28	57.57	
	14	11.55	11.83	13.12	13.95	14.89	15.95	18.56	20.19	24.58	61.91	154.21	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 m (RADIUS = 9.9 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	4.59	4.94	6.92	9.23	12.55	16.80	28.65	36.62	57.72	181.70	456.79
	10	5.25	6.04	11.35	16.35	22.84	31.08	54.12	69.64	110.73	352.52	889.48
	14	6.93	10.52	28.23	41.90	59.61	82.14	145.16	187.62	300.19	963.01	2435.8
100	8	5.88	6.27	8.02	9.74	12.62	16.80	28.65	36.62	57.72	181.70	456.79
	10	6.76	7.53	11.64	16.36	22.84	31.08	54.12	69.64	110.73	352.52	889.48
	14	8.79	11.44	28.23	41.90	59.61	82.14	145.16	187.62	300.19	963.01	2435.8
150	8	6.92	7.33	9.08	10.60	13.02	16.86	28.65	36.62	57.72	181.70	456.79
	10	7.97	8.76	12.39	16.50	22.84	31.08	54.12	69.64	110.73	352.52	889.48
	14	10.30	12.69	28.24	41.90	59.61	82.14	145.16	187.62	300.19	963.01	2435.8
200	8	7.81	8.26	10.04	11.49	13.66	17.08	28.65	36.62	57.72	181.70	456.79
	10	9.02	9.83	13.29	16.89	22.88	31.09	54.12	69.64	110.73	352.52	889.48
	14	11.61	13.91	28.25	41.90	59.61	82.14	145.16	187.62	300.19	963.01	2435.8
250	8	8.62	9.08	10.92	12.35	14.38	17.48	28.66	36.62	57.72	181.70	456.79
	10	9.95	10.79	14.18	17.47	23.00	31.09	54.12	69.64	110.73	352.52	889.48
	14	12.80	15.06	28.32	41.90	59.61	82.14	145.16	187.62	300.19	963.01	2435.8
300	8	9.36	9.84	11.73	13.16	15.12	18.00	28.68	36.62	57.72	181.70	456.79
	10	10.82	11.68	15.05	18.14	23.25	31.11	54.12	69.64	110.73	352.52	889.48
	14	13.89	16.13	28.49	41.90	59.61	82.14	145.16	187.62	300.19	963.01	2435.8
350	8	10.05	10.55	12.50	13.93	15.85	18.58	28.74	36.63	57.72	181.70	456.79
	10	11.62	12.51	15.89	18.84	23.62	31.17	54.12	69.64	110.73	352.52	889.48
	14	14.90	17.15	28.78	41.91	59.61	82.14	145.16	187.62	300.19	963.01	2435.8
400	8	10.70	11.22	13.21	14.66	16.56	19.20	28.86	36.64	57.72	181.70	456.79
	10	12.37	13.28	16.69	19.56	24.07	31.28	54.12	69.64	110.73	352.52	889.48
	14	15.85	18.11	29.17	41.93	59.61	82.14	145.16	187.62	300.19	963.01	2435.8
450	8	11.31	11.85	13.90	15.36	17.25	19.82	29.03	36.67	57.72	181.70	456.79
	10	13.09	14.02	17.46	20.28	24.58	31.45	54.12	69.64	110.73	352.52	889.48
	14	16.76	19.02	29.66	41.98	59.61	82.14	145.16	187.62	300.19	963.01	2435.8
500	8	11.90	12.46	14.55	16.03	17.92	20.45	29.27	36.72	57.72	181.70	456.79
	10	13.78	14.73	18.20	20.98	25.13	31.69	54.12	69.64	110.73	352.52	889.48
	14	17.62	19.90	30.20	42.07	59.61	82.14	145.16	187.62	300.19	963.01	2435.8

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 m (RADIUS = 9.9 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	12.46	13.03	15.18	16.68	18.57	21.06	29.57	36.80	57.72	181.70	456.79
	10	14.43	15.40	18.91	21.67	25.70	31.99	54.13	69.64	110.73	352.52	889.48
	14	18.45	20.75	30.79	42.21	59.62	82.14	145.16	187.62	300.19	963.01	2435.8
600	8	13.01	13.59	15.78	17.30	19.20	21.67	29.91	36.92	57.72	181.70	456.79
	10	15.06	16.05	19.60	22.35	26.29	32.34	54.13	69.64	110.73	352.52	889.48
	14	19.24	21.56	31.40	42.40	59.63	82.14	145.16	187.62	300.19	963.01	2435.8
650	8	13.53	14.13	16.36	17.90	19.82	22.27	30.29	37.08	57.73	181.70	456.79
	10	15.67	16.68	20.27	23.01	26.88	32.73	54.14	69.64	110.73	352.52	889.48
	14	20.01	22.35	32.03	42.63	59.64	82.14	145.16	187.62	300.19	963.01	2435.8
700	8	14.04	14.65	16.93	18.49	20.41	22.86	30.69	37.28	57.73	181.70	456.79
	10	16.26	17.28	20.92	23.66	27.47	33.15	54.16	69.64	110.73	352.52	889.48
	14	20.76	23.11	32.67	42.91	59.66	82.14	145.16	187.62	300.19	963.01	2435.8
750	8	14.53	15.15	17.47	19.05	20.99	23.44	31.11	37.51	57.74	181.70	456.79
	10	16.84	17.87	21.55	24.29	28.06	33.59	54.19	69.64	110.73	352.52	889.48
	14	21.48	23.85	33.32	43.24	59.70	82.14	145.16	187.62	300.19	963.01	2435.8
800	8	15.01	15.64	18.00	19.61	21.56	24.01	31.56	37.77	57.75	181.70	456.79
	10	17.39	18.44	22.17	24.91	28.65	34.06	54.24	69.64	110.73	352.52	889.48
	14	22.18	24.57	33.96	43.60	59.75	82.15	145.16	187.62	300.19	963.01	2435.8
850	8	15.48	16.12	18.52	20.14	22.12	24.56	32.01	38.06	57.77	181.70	456.79
	10	17.93	19.00	22.77	25.52	29.23	34.53	54.29	69.65	110.73	352.52	889.48
	14	22.86	25.27	34.61	44.00	59.82	82.15	145.16	187.62	300.19	963.01	2435.8
900	8	15.94	16.59	19.03	20.67	22.66	25.11	32.47	38.38	57.80	181.70	456.79
	10	18.46	19.55	23.35	26.12	29.80	35.02	54.37	69.65	110.73	352.52	889.48
	14	23.53	25.96	35.25	44.42	59.92	82.15	145.16	187.62	300.19	963.01	2435.8
950	8	16.38	17.04	19.52	21.18	23.19	25.65	32.93	38.71	57.83	181.70	456.79
	10	18.98	20.08	23.93	26.70	30.37	35.51	54.47	69.66	110.73	352.52	889.48
	14	24.18	26.62	35.88	44.86	60.03	82.16	145.16	187.62	300.19	963.01	2435.8
1000	8	16.82	17.49	20.00	21.69	23.71	26.18	33.40	39.07	57.88	181.70	456.79
	10	19.49	20.60	24.49	27.27	30.93	36.01	54.58	69.68	110.73	352.52	889.48
	14	24.81	27.28	36.52	45.32	60.17	82.16	145.16	187.62	300.19	963.01	2435.8

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 m (RADIUS = 9.9 m)
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50 (m*s) ^{1/2}	8	13.17	28.45	81.52	122.24	175.04	242.22	430.15	556.82	892.67	2870.9	7267.2
	10	22.83	53.52	157.13	236.60	339.67	470.81	837.72	1085.1	1740.9	5604.0	14190.
	14	58.68	143.09	427.33	645.31	928.02	1287.7	2294.3	2972.8	4772.0	15372.	38931.
100	8	15.07	28.46	81.52	122.24	175.04	242.22	430.15	556.82	892.67	2870.9	7267.2
	10	23.14	53.52	157.13	236.60	339.67	470.81	837.72	1085.1	1740.9	5604.0	14190.
	14	58.68	143.09	427.33	645.31	928.02	1287.7	2294.3	2972.8	4772.0	15372.	38931.
150	8	17.06	28.56	81.52	122.24	175.04	242.22	430.15	556.82	892.67	2870.9	7267.2
	10	24.28	53.52	157.13	236.60	339.67	470.81	837.72	1085.1	1740.9	5604.0	14190.
	14	58.68	143.09	427.33	645.31	928.02	1287.7	2294.3	2972.8	4772.0	15372.	38931.
200	8	18.89	28.96	81.52	122.24	175.04	242.22	430.15	556.82	892.67	2870.9	7267.2
	10	25.83	53.52	157.13	236.60	339.67	470.81	837.72	1085.1	1740.9	5604.0	14190.
	14	58.69	143.09	427.33	645.31	928.02	1287.7	2294.3	2972.8	4772.0	15372.	38931.
250	8	20.58	29.67	81.52	122.24	175.04	242.22	430.15	556.82	892.67	2870.9	7267.2
	10	27.46	53.53	157.13	236.60	339.67	470.81	837.72	1085.1	1740.9	5604.0	14190.
	14	58.74	143.09	427.33	645.31	928.02	1287.7	2294.3	2972.8	4772.0	15372.	38931.
300	8	22.15	30.60	81.52	122.24	175.04	242.22	430.15	556.82	892.67	2870.9	7267.2
	10	29.08	53.57	157.13	236.60	339.67	470.81	837.72	1085.1	1740.9	5604.0	14190.
	14	58.89	143.09	427.33	645.31	928.02	1287.7	2294.3	2972.8	4772.0	15372.	38931.
350	8	23.61	31.63	81.52	122.24	175.04	242.22	430.15	556.82	892.67	2870.9	7267.2
	10	30.66	53.67	157.13	236.60	339.67	470.81	837.72	1085.1	1740.9	5604.0	14190.
	14	59.21	143.09	427.33	645.31	928.02	1287.7	2294.3	2972.8	4772.0	15372.	38931.
400	8	25.00	32.71	81.52	122.24	175.04	242.22	430.15	556.82	892.67	2870.9	7267.2
	10	32.18	53.87	157.13	236.60	339.67	470.81	837.72	1085.1	1740.9	5604.0	14190.
	14	59.71	143.09	427.33	645.31	928.02	1287.7	2294.3	2972.8	4772.0	15372.	38931.
450	8	26.32	33.81	81.52	122.24	175.04	242.22	430.15	556.82	892.67	2870.9	7267.2
	10	33.65	54.18	157.13	236.60	339.67	470.81	837.72	1085.1	1740.9	5604.0	14190.
	14	60.39	143.09	427.33	645.31	928.02	1287.7	2294.3	2972.8	4772.0	15372.	38931.
500	8	27.59	34.91	81.52	122.24	175.04	242.22	430.15	556.82	892.67	2870.9	7267.2
	10	35.06	54.61	157.13	236.60	339.67	470.81	837.72	1085.1	1740.9	5604.0	14190.
	14	61.21	143.09	427.33	645.31	928.02	1287.7	2294.3	2972.8	4772.0	15372.	38931.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 m (RADIUS = 9.9 m)³
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	28.80	36.00	81.53	122.24	175.04	242.22	430.15	556.82	892.67	2870.9	7267.2	
	10	36.43	55.14	157.13	236.60	339.67	470.81	837.72	1085.1	1740.9	5604.0	14190.	
	14	62.14	143.09	427.33	645.31	928.02	1287.7	2294.3	2972.8	4772.0	15372.	38931.	
600	8	29.97	37.08	81.54	122.24	175.04	242.22	430.15	556.82	892.67	2870.9	7267.2	
	10	37.76	55.76	157.13	236.60	339.67	470.81	837.72	1085.1	1740.9	5604.0	14190.	
	14	63.16	143.09	427.33	645.31	928.02	1287.7	2294.3	2972.8	4772.0	15372.	38931.	
650	8	31.09	38.13	81.55	122.24	175.04	242.22	430.15	556.82	892.67	2870.9	7267.2	
	10	39.04	56.45	157.13	236.60	339.67	470.81	837.72	1085.1	1740.9	5604.0	14190.	
	14	64.23	143.09	427.33	645.31	928.02	1287.7	2294.3	2972.8	4772.0	15372.	38931.	
700	8	32.18	39.17	81.58	122.24	175.04	242.22	430.15	556.82	892.67	2870.9	7267.2	
	10	40.29	57.19	157.13	236.60	339.67	470.81	837.72	1085.1	1740.9	5604.0	14190.	
	14	65.34	143.09	427.33	645.31	928.02	1287.7	2294.3	2972.8	4772.0	15372.	38931.	
750	8	33.24	40.19	81.62	122.24	175.04	242.22	430.15	556.82	892.67	2870.9	7267.2	
	10	41.51	57.98	157.13	236.60	339.67	470.81	837.72	1085.1	1740.9	5604.0	14190.	
	14	66.48	143.09	427.33	645.31	928.02	1287.7	2294.3	2972.8	4772.0	15372.	38931.	
800	8	34.27	41.19	81.68	122.24	175.04	242.22	430.15	556.82	892.67	2870.9	7267.2	
	10	42.70	58.80	157.13	236.60	339.67	470.81	837.72	1085.1	1740.9	5604.0	14190.	
	14	67.64	143.09	427.33	645.31	928.02	1287.7	2294.3	2972.8	4772.0	15372.	38931.	
850	8	35.28	42.17	81.77	122.24	175.04	242.22	430.15	556.82	892.67	2870.9	7267.2	
	10	43.85	59.64	157.13	236.60	339.67	470.81	837.72	1085.1	1740.9	5604.0	14190.	
	14	68.81	143.10	427.33	645.31	928.02	1287.7	2294.3	2972.8	4772.0	15372.	38931.	
900	8	36.26	43.13	81.88	122.24	175.04	242.22	430.15	556.82	892.67	2870.9	7267.2	
	10	44.99	60.50	157.13	236.60	339.67	470.81	837.72	1085.1	1740.9	5604.0	14190.	
	14	69.98	143.10	427.33	645.31	928.02	1287.7	2294.3	2972.8	4772.0	15372.	38931.	
950	8	37.21	44.07	82.02	122.24	175.04	242.22	430.15	556.82	892.67	2870.9	7267.2	
	10	46.09	61.37	157.13	236.60	339.67	470.81	837.72	1085.1	1740.9	5604.0	14190.	
	14	71.15	143.11	427.33	645.31	928.02	1287.7	2294.3	2972.8	4772.0	15372.	38931.	
1000	8	38.15	45.00	82.19	122.24	175.04	242.22	430.15	556.82	892.67	2870.9	7267.2	
	10	47.18	62.24	157.13	236.60	339.67	470.81	837.72	1085.1	1740.9	5604.0	14190.	
	14	72.32	143.13	427.33	645.31	928.02	1287.7	2294.3	2972.8	4772.0	15372.	38931.	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.5 m (RADIUS = 10.3 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	1.63	1.58	1.64	1.69	1.75	1.82	1.96	2.04	2.20	2.78	3.73
	10	1.72	1.68	1.76	1.82	1.89	1.96	2.13	2.22	2.43	3.27	5.32
	14	1.90	1.87	1.98	2.06	2.16	2.27	2.52	2.66	3.02	5.46	11.71
100	8	1.93	1.89	1.97	2.03	2.10	2.18	2.35	2.44	2.63	3.30	4.25
	10	2.07	2.04	2.13	2.21	2.29	2.39	2.59	2.70	2.93	3.84	5.55
	14	2.33	2.31	2.45	2.56	2.67	2.80	3.09	3.26	3.63	5.68	11.71
150	8	2.18	2.14	2.23	2.30	2.38	2.47	2.66	2.77	2.98	3.72	4.72
	10	2.36	2.32	2.44	2.52	2.62	2.72	2.95	3.08	3.34	4.32	5.95
	14	2.69	2.67	2.83	2.95	3.08	3.23	3.55	3.73	4.14	6.10	11.72
200	8	2.39	2.35	2.46	2.54	2.63	2.73	2.94	3.05	3.28	4.09	5.14
	10	2.60	2.57	2.70	2.79	2.90	3.02	3.27	3.40	3.69	4.75	6.37
	14	2.99	2.97	3.16	3.29	3.44	3.60	3.95	4.15	4.58	6.55	11.74
250	8	2.59	2.55	2.66	2.75	2.85	2.95	3.18	3.30	3.55	4.42	5.51
	10	2.83	2.79	2.93	3.04	3.16	3.28	3.55	3.70	4.01	5.13	6.78
	14	3.27	3.25	3.45	3.60	3.75	3.93	4.31	4.52	4.98	6.98	11.83
300	8	2.77	2.73	2.85	2.94	3.05	3.16	3.40	3.53	3.80	4.72	5.87
	10	3.03	3.00	3.15	3.26	3.39	3.52	3.81	3.97	4.30	5.48	7.16
	14	3.52	3.51	3.73	3.88	4.05	4.23	4.64	4.86	5.35	7.39	11.98
350	8	2.93	2.89	3.03	3.13	3.24	3.36	3.61	3.75	4.03	5.00	6.19
	10	3.22	3.19	3.36	3.48	3.61	3.75	4.06	4.22	4.57	5.80	7.53
	14	3.76	3.74	3.98	4.14	4.32	4.51	4.94	5.18	5.69	7.78	12.19
400	8	3.09	3.05	3.19	3.30	3.42	3.54	3.81	3.95	4.25	5.26	6.50
	10	3.41	3.37	3.55	3.67	3.81	3.96	4.29	4.46	4.82	6.11	7.88
	14	3.98	3.97	4.22	4.39	4.58	4.78	5.23	5.47	6.01	8.16	12.43
450	8	3.24	3.20	3.35	3.46	3.58	3.72	4.00	4.15	4.46	5.51	6.79
	10	3.58	3.54	3.73	3.86	4.01	4.16	4.50	4.68	5.06	6.40	8.21
	14	4.19	4.18	4.44	4.62	4.82	5.03	5.50	5.76	6.31	8.52	12.71
500	8	3.38	3.34	3.50	3.62	3.75	3.88	4.18	4.33	4.66	5.75	7.07
	10	3.74	3.71	3.90	4.04	4.19	4.36	4.71	4.90	5.29	6.68	8.54
	14	4.40	4.39	4.66	4.85	5.05	5.28	5.76	6.03	6.60	8.86	13.00

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.5 m (RADIUS = 10.3 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	3.52	3.48	3.64	3.77	3.90	4.04	4.35	4.51	4.85	5.98	7.34	
	10	3.90	3.87	4.07	4.21	4.37	4.54	4.91	5.10	5.51	6.94	8.84	
	14	4.59	4.58	4.87	5.06	5.28	5.51	6.01	6.29	6.88	9.19	13.30	
600	8	3.65	3.61	3.78	3.91	4.05	4.20	4.51	4.68	5.03	6.20	7.60	
	10	4.05	4.02	4.23	4.38	4.54	4.72	5.10	5.30	5.73	7.20	9.14	
	14	4.78	4.77	5.07	5.27	5.49	5.73	6.25	6.54	7.15	9.51	13.60	
650	8	3.78	3.74	3.92	4.05	4.19	4.35	4.67	4.84	5.20	6.41	7.85	
	10	4.20	4.17	4.39	4.54	4.71	4.89	5.28	5.49	5.93	7.45	9.43	
	14	4.96	4.95	5.26	5.47	5.70	5.95	6.49	6.78	7.41	9.82	13.90	
700	8	3.91	3.87	4.05	4.18	4.33	4.49	4.83	5.00	5.38	6.61	8.09	
	10	4.34	4.31	4.54	4.70	4.87	5.06	5.46	5.68	6.13	7.69	9.71	
	14	5.13	5.13	5.45	5.66	5.90	6.16	6.71	7.01	7.66	10.12	14.20	
750	8	4.03	3.99	4.18	4.31	4.47	4.63	4.98	5.16	5.54	6.81	8.33	
	10	4.48	4.45	4.68	4.85	5.03	5.22	5.64	5.86	6.32	7.92	9.98	
	14	5.31	5.30	5.63	5.85	6.10	6.36	6.93	7.24	7.90	10.41	14.50	
800	8	4.14	4.10	4.30	4.44	4.60	4.77	5.12	5.31	5.70	7.01	8.55	
	10	4.61	4.58	4.82	4.99	5.18	5.38	5.81	6.03	6.51	8.15	10.25	
	14	5.47	5.47	5.80	6.03	6.29	6.55	7.14	7.46	8.14	10.69	14.80	
850	8	4.26	4.22	4.42	4.57	4.73	4.90	5.27	5.46	5.86	7.19	8.78	
	10	4.75	4.72	4.96	5.14	5.33	5.53	5.97	6.20	6.69	8.37	10.50	
	14	5.63	5.63	5.98	6.21	6.47	6.75	7.35	7.67	8.37	10.97	15.09	
900	8	4.37	4.33	4.54	4.69	4.85	5.03	5.40	5.60	6.01	7.38	8.99	
	10	4.87	4.84	5.10	5.28	5.47	5.68	6.13	6.37	6.87	8.58	10.76	
	14	5.79	5.79	6.15	6.39	6.65	6.93	7.55	7.88	8.59	11.24	15.38	
950	8	4.48	4.44	4.65	4.81	4.98	5.16	5.54	5.74	6.16	7.56	9.20	
	10	5.00	4.97	5.23	5.41	5.61	5.83	6.29	6.53	7.04	8.79	11.00	
	14	5.95	5.94	6.31	6.56	6.83	7.12	7.74	8.08	8.81	11.50	15.67	
1000	8	4.59	4.55	4.76	4.92	5.09	5.28	5.67	5.88	6.31	7.73	9.41	
	10	5.12	5.09	5.36	5.55	5.75	5.97	6.44	6.69	7.21	9.00	11.24	
	14	6.10	6.10	6.47	6.72	7.00	7.30	7.94	8.28	9.02	11.76	15.95	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.5 m (RADIUS = 10.3 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	2.64	2.62	2.83	2.98	3.16	3.37	3.92	4.30	5.48	13.88	32.23	
	10	2.86	2.88	3.18	3.41	3.69	4.05	5.22	6.18	8.99	25.31	60.88	
	14	3.31	3.42	4.07	4.65	5.55	6.97	11.29	14.20	21.84	66.14	163.27	
100	8	3.27	3.27	3.52	3.70	3.91	4.15	4.73	5.09	6.05	13.88	32.23	
	10	3.59	3.63	3.99	4.25	4.55	4.92	5.92	6.66	9.05	25.31	60.88	
	14	4.23	4.37	5.07	5.61	6.34	7.41	11.31	14.20	21.84	66.14	163.27	
150	8	3.78	3.78	4.08	4.28	4.51	4.77	5.39	5.76	6.70	13.89	32.23	
	10	4.18	4.23	4.64	4.92	5.25	5.64	6.63	7.31	9.36	25.31	60.88	
	14	4.96	5.12	5.88	6.43	7.14	8.09	11.45	14.22	21.84	66.14	163.27	
200	8	4.22	4.23	4.56	4.78	5.03	5.32	5.97	6.36	7.31	13.94	32.23	
	10	4.69	4.75	5.20	5.51	5.86	6.27	7.28	7.95	9.82	25.31	60.88	
	14	5.60	5.77	6.58	7.16	7.87	8.79	11.80	14.33	21.84	66.14	163.27	
250	8	4.62	4.63	4.99	5.23	5.50	5.80	6.50	6.90	7.87	14.09	32.23	
	10	5.15	5.21	5.70	6.03	6.40	6.83	7.88	8.54	10.34	25.31	60.88	
	14	6.17	6.36	7.22	7.81	8.54	9.45	12.26	14.57	21.85	66.14	163.27	
300	8	4.99	5.00	5.38	5.64	5.93	6.25	6.98	7.40	8.40	14.32	32.23	
	10	5.58	5.64	6.16	6.51	6.91	7.35	8.44	9.11	10.87	25.31	60.88	
	14	6.70	6.90	7.80	8.42	9.16	10.08	12.77	14.91	21.87	66.14	163.27	
350	8	5.33	5.35	5.75	6.03	6.33	6.67	7.43	7.87	8.89	14.62	32.23	
	10	5.97	6.04	6.59	6.96	7.37	7.84	8.95	9.63	11.38	25.32	60.88	
	14	7.20	7.40	8.34	8.98	9.74	10.67	13.30	15.31	21.94	66.14	163.27	
400	8	5.65	5.67	6.10	6.39	6.71	7.06	7.85	8.31	9.35	14.97	32.23	
	10	6.35	6.42	7.00	7.38	7.81	8.30	9.44	10.14	11.89	25.34	60.88	
	14	7.66	7.88	8.86	9.51	10.29	11.23	13.83	15.76	22.05	66.14	163.27	
450	8	5.96	5.98	6.43	6.73	7.07	7.43	8.26	8.72	9.80	15.34	32.23	
	10	6.70	6.78	7.38	7.78	8.23	8.73	9.91	10.62	12.37	25.38	60.88	
	14	8.10	8.32	9.34	10.02	10.82	11.77	14.35	16.22	22.22	66.14	163.27	
500	8	6.25	6.28	6.75	7.06	7.41	7.78	8.64	9.12	10.22	15.72	32.24	
	10	7.04	7.12	7.75	8.16	8.63	9.14	10.36	11.07	12.84	25.45	60.88	
	14	8.52	8.75	9.80	10.50	11.32	12.28	14.86	16.69	22.44	66.14	163.27	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.5 m (RADIUS = 10.3 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	6.53	6.56	7.05	7.37	7.73	8.12	9.01	9.50	10.63	16.12	32.25	
	10	7.36	7.45	8.10	8.53	9.01	9.54	10.78	11.51	13.30	25.54	60.88	
	14	8.92	9.16	10.25	10.96	11.80	12.77	15.36	17.15	22.70	66.14	163.27	
600	8	6.80	6.84	7.34	7.68	8.05	8.45	9.36	9.87	11.02	16.51	32.27	
	10	7.67	7.77	8.44	8.88	9.38	9.92	11.19	11.94	13.74	25.67	60.88	
	14	9.31	9.56	10.67	11.41	12.26	13.25	15.85	17.62	22.99	66.14	163.27	
650	8	7.06	7.10	7.62	7.97	8.35	8.77	9.70	10.22	11.40	16.90	32.29	
	10	7.98	8.07	8.77	9.22	9.73	10.29	11.59	12.35	14.17	25.84	60.88	
	14	9.69	9.94	11.08	11.84	12.70	13.71	16.32	18.08	23.31	66.14	163.27	
700	8	7.32	7.35	7.89	8.25	8.65	9.07	10.03	10.56	11.77	17.28	32.34	
	10	8.27	8.37	9.08	9.55	10.07	10.65	11.98	12.75	14.59	26.03	60.88	
	14	10.05	10.31	11.48	12.25	13.14	14.16	16.78	18.53	23.65	66.14	163.27	
750	8	7.56	7.60	8.16	8.52	8.93	9.37	10.35	10.90	12.12	17.67	32.39	
	10	8.55	8.65	9.39	9.87	10.40	10.99	12.35	13.13	15.00	26.24	60.88	
	14	10.41	10.67	11.87	12.65	13.56	14.59	17.24	18.98	24.00	66.14	163.27	
800	8	7.80	7.84	8.41	8.79	9.21	9.66	10.66	11.22	12.47	18.05	32.47	
	10	8.83	8.93	9.69	10.18	10.73	11.33	12.71	13.51	15.39	26.48	60.88	
	14	10.75	11.02	12.24	13.04	13.96	15.02	17.68	19.42	24.36	66.14	163.27	
850	8	8.04	8.08	8.66	9.05	9.48	9.94	10.97	11.53	12.81	18.42	32.56	
	10	9.10	9.20	9.98	10.48	11.04	11.66	13.07	13.88	15.78	26.73	60.88	
	14	11.08	11.36	12.61	13.43	14.36	15.43	18.11	19.85	24.73	66.14	163.27	
900	8	8.27	8.31	8.91	9.30	9.74	10.21	11.26	11.84	13.13	18.79	32.67	
	10	9.36	9.47	10.26	10.78	11.35	11.98	13.41	14.23	16.16	27.00	60.88	
	14	11.41	11.69	12.97	13.80	14.75	15.83	18.54	20.27	25.10	66.14	163.27	
950	8	8.49	8.53	9.15	9.55	10.00	10.48	11.55	12.14	13.46	19.15	32.80	
	10	9.62	9.73	10.54	11.07	11.65	12.29	13.75	14.58	16.53	27.28	60.88	
	14	11.73	12.01	13.32	14.16	15.13	16.22	18.95	20.69	25.48	66.14	163.27	
1000	8	8.71	8.75	9.38	9.79	10.25	10.74	11.83	12.44	13.77	19.51	32.94	
	10	9.87	9.98	10.81	11.35	11.94	12.59	14.08	14.93	16.89	27.56	60.88	
	14	12.04	12.33	13.66	14.52	15.50	16.61	19.36	21.10	25.85	66.14	163.27	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.5 m (RADIUS = 10.3 m)
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	4.79	5.19	7.48	10.11	13.77	18.40	31.24	39.84	62.50	194.29	483.82	
	10	5.51	6.42	12.55	18.07	25.18	34.17	59.15	75.89	120.03	377.08	942.22	
	14	7.38	11.71	31.47	46.53	65.95	90.54	158.89	204.72	325.64	1030.3	2580.4	
100	8	6.15	6.57	8.52	10.50	13.80	18.40	31.24	39.84	62.50	194.29	483.82	
	10	7.09	7.94	12.74	18.07	25.18	34.17	59.15	75.89	120.03	377.08	942.22	
	14	9.29	12.44	31.47	46.53	65.95	90.54	158.89	204.72	325.64	1030.3	2580.4	
150	8	7.23	7.68	9.59	11.31	14.10	18.43	31.24	39.84	62.50	194.29	483.82	
	10	8.35	9.22	13.38	18.15	25.18	34.17	59.15	75.89	120.03	377.08	942.22	
	14	10.86	13.64	31.47	46.53	65.95	90.54	158.89	204.72	325.64	1030.3	2580.4	
200	8	8.16	8.64	10.58	12.19	14.66	18.57	31.24	39.84	62.50	194.29	483.82	
	10	9.44	10.33	14.23	18.43	25.19	34.17	59.15	75.89	120.03	377.08	942.22	
	14	12.23	14.86	31.47	46.53	65.95	90.54	158.89	204.72	325.64	1030.3	2580.4	
250	8	9.00	9.50	11.48	13.05	15.34	18.89	31.24	39.84	62.50	194.29	483.82	
	10	10.42	11.33	15.11	18.91	25.26	34.17	59.15	75.89	120.03	377.08	942.22	
	14	13.47	16.03	31.50	46.53	65.95	90.54	158.89	204.72	325.64	1030.3	2580.4	
300	8	9.77	10.29	12.32	13.88	16.06	19.34	31.26	39.84	62.50	194.29	483.82	
	10	11.32	12.26	15.99	19.52	25.43	34.18	59.15	75.89	120.03	377.08	942.22	
	14	14.60	17.13	31.60	46.53	65.95	90.54	158.89	204.72	325.64	1030.3	2580.4	
350	8	10.49	11.03	13.11	14.67	16.79	19.88	31.29	39.84	62.50	194.29	483.82	
	10	12.16	13.12	16.84	20.20	25.71	34.21	59.15	75.89	120.03	377.08	942.22	
	14	15.66	18.18	31.79	46.53	65.95	90.54	158.89	204.72	325.64	1030.3	2580.4	
400	8	11.17	11.73	13.86	15.42	17.51	20.47	31.36	39.85	62.50	194.29	483.82	
	10	12.95	13.93	17.66	20.90	26.09	34.28	59.15	75.89	120.03	377.08	942.22	
	14	16.66	19.17	32.08	46.54	65.95	90.54	158.89	204.72	325.64	1030.3	2580.4	
450	8	11.81	12.39	14.56	16.14	18.21	21.07	31.49	39.86	62.50	194.29	483.82	
	10	13.70	14.70	18.45	21.60	26.54	34.39	59.15	75.89	120.03	377.08	942.22	
	14	17.60	20.12	32.47	46.56	65.95	90.54	158.89	204.72	325.64	1030.3	2580.4	
500	8	12.43	13.01	15.24	16.83	18.89	21.69	31.67	39.89	62.50	194.29	483.82	
	10	14.41	15.43	19.21	22.31	27.04	34.56	59.15	75.89	120.03	377.08	942.22	
	14	18.50	21.03	32.93	46.61	65.95	90.54	158.89	204.72	325.64	1030.3	2580.4	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.5 m (RADIUS = 10.3 m)³
 FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	13.02	13.62	15.89	17.50	19.56	22.31	31.90	39.95	62.50	194.29	483.82	
	10	15.09	16.14	19.94	23.00	27.57	34.79	59.15	75.89	120.03	377.08	942.22	
	14	19.37	21.91	33.45	46.69	65.95	90.54	158.89	204.72	325.64	1030.3	2580.4	
600	8	13.58	14.20	16.52	18.14	20.20	22.92	32.19	40.03	62.50	194.29	483.82	
	10	15.75	16.81	20.65	23.69	28.13	35.07	59.16	75.89	120.03	377.08	942.22	
	14	20.20	22.75	34.01	46.81	65.96	90.54	158.89	204.72	325.64	1030.3	2580.4	
650	8	14.13	14.76	17.12	18.76	20.83	23.52	32.52	40.14	62.50	194.29	483.82	
	10	16.39	17.47	21.34	24.36	28.71	35.40	59.16	75.89	120.03	377.08	942.22	
	14	21.00	23.57	34.60	46.97	65.96	90.54	158.89	204.72	325.64	1030.3	2580.4	
700	8	14.66	15.30	17.70	19.37	21.44	24.12	32.88	40.28	62.50	194.29	483.82	
	10	17.01	18.10	22.02	25.02	29.29	35.77	59.17	75.89	120.03	377.08	942.22	
	14	21.78	24.36	35.21	47.17	65.97	90.54	158.89	204.72	325.64	1030.3	2580.4	
750	8	15.17	15.82	18.27	19.96	22.04	24.70	33.27	40.47	62.51	194.29	483.82	
	10	17.60	18.71	22.67	25.67	29.87	36.17	59.19	75.89	120.03	377.08	942.22	
	14	22.53	25.13	35.83	47.42	65.99	90.54	158.89	204.72	325.64	1030.3	2580.4	
800	8	15.67	16.34	18.82	20.53	22.62	25.28	33.68	40.68	62.51	194.29	483.82	
	10	18.18	19.31	23.30	26.30	30.45	36.59	59.21	75.89	120.03	377.08	942.22	
	14	23.26	25.88	36.46	47.71	66.02	90.54	158.89	204.72	325.64	1030.3	2580.4	
850	8	16.16	16.83	19.36	21.08	23.20	25.85	34.10	40.92	62.52	194.29	483.82	
	10	18.75	19.89	23.93	26.93	31.03	37.03	59.24	75.89	120.03	377.08	942.22	
	14	23.98	26.61	37.10	48.03	66.06	90.54	158.89	204.72	325.64	1030.3	2580.4	
900	8	16.64	17.32	19.89	21.63	23.75	26.41	34.54	41.19	62.54	194.29	483.82	
	10	19.30	20.46	24.53	27.54	31.61	37.49	59.29	75.90	120.03	377.08	942.22	
	14	24.67	27.33	37.73	48.38	66.11	90.55	158.89	204.72	325.64	1030.3	2580.4	
950	8	17.10	17.79	20.40	22.16	24.30	26.96	34.99	41.49	62.56	194.29	483.82	
	10	19.84	21.01	25.12	28.14	32.19	37.96	59.35	75.90	120.03	377.08	942.22	
	14	25.35	28.02	38.37	48.77	66.18	90.55	158.89	204.72	325.64	1030.3	2580.4	
1000	8	17.56	18.26	20.90	22.68	24.84	27.50	35.44	41.80	62.59	194.29	483.82	
	10	20.37	21.55	25.71	28.73	32.75	38.44	59.43	75.91	120.03	377.08	942.22	
	14	26.02	28.70	39.00	49.17	66.27	90.55	158.89	204.72	325.64	1030.3	2580.4	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.5 m (RADIUS = 10.3 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
50	8	14.59	32.03	91.10	135.99	193.91	267.24	471.09	607.82	968.58	3071.8	7698.9
	10	25.81	60.44	175.78	263.41	376.47	519.63	917.64	1184.6	1889.1	5996.5	15033.
	14	66.74	161.98	478.41	718.80	1028.9	1421.6	2513.5	3245.9	5178.7	16448.	41245.
100	8	16.29	32.03	91.10	135.99	193.91	267.24	471.09	607.82	968.58	3071.8	7698.9
	10	25.97	60.44	175.78	263.41	376.47	519.63	917.64	1184.6	1889.1	5996.5	15033.
	14	66.74	161.98	478.41	718.80	1028.9	1421.6	2513.5	3245.9	5178.7	16448.	41245.
150	8	18.27	32.08	91.10	135.99	193.91	267.24	471.09	607.82	968.58	3071.8	7698.9
	10	26.82	60.44	175.78	263.41	376.47	519.63	917.64	1184.6	1889.1	5996.5	15033.
	14	66.74	161.98	478.41	718.80	1028.9	1421.6	2513.5	3245.9	5178.7	16448.	41245.
200	8	20.15	32.31	91.10	135.99	193.91	267.24	471.09	607.82	968.58	3071.8	7698.9
	10	28.20	60.44	175.78	263.41	376.47	519.63	917.64	1184.6	1889.1	5996.5	15033.
	14	66.74	161.98	478.41	718.80	1028.9	1421.6	2513.5	3245.9	5178.7	16448.	41245.
250	8	21.88	32.83	91.10	135.99	193.91	267.24	471.09	607.82	968.58	3071.8	7698.9
	10	29.76	60.45	175.78	263.41	376.47	519.63	917.64	1184.6	1889.1	5996.5	15033.
	14	66.76	161.98	478.41	718.80	1028.9	1421.6	2513.5	3245.9	5178.7	16448.	41245.
300	8	23.50	33.59	91.10	135.99	193.91	267.24	471.09	607.82	968.58	3071.8	7698.9
	10	31.37	60.46	175.78	263.41	376.47	519.63	917.64	1184.6	1889.1	5996.5	15033.
	14	66.82	161.98	478.41	718.80	1028.9	1421.6	2513.5	3245.9	5178.7	16448.	41245.
350	8	25.03	34.52	91.10	135.99	193.91	267.24	471.09	607.82	968.58	3071.8	7698.9
	10	32.95	60.50	175.78	263.41	376.47	519.63	917.64	1184.6	1889.1	5996.5	15033.
	14	66.98	161.98	478.41	718.80	1028.9	1421.6	2513.5	3245.9	5178.7	16448.	41245.
400	8	26.47	35.53	91.10	135.99	193.91	267.24	471.09	607.82	968.58	3071.8	7698.9
	10	34.49	60.60	175.78	263.41	376.47	519.63	917.64	1184.6	1889.1	5996.5	15033.
	14	67.28	161.98	478.41	718.80	1028.9	1421.6	2513.5	3245.9	5178.7	16448.	41245.
450	8	27.85	36.59	91.10	135.99	193.91	267.24	471.09	607.82	968.58	3071.8	7698.9
	10	35.99	60.78	175.78	263.41	376.47	519.63	917.64	1184.6	1889.1	5996.5	15033.
	14	67.73	161.98	478.41	718.80	1028.9	1421.6	2513.5	3245.9	5178.7	16448.	41245.
500	8	29.16	37.66	91.10	135.99	193.91	267.24	471.09	607.82	968.58	3071.8	7698.9
	10	37.45	61.05	175.78	263.41	376.47	519.63	917.64	1184.6	1889.1	5996.5	15033.
	14	68.34	161.98	478.41	718.80	1028.9	1421.6	2513.5	3245.9	5178.7	16448.	41245.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.5 m (RADIUS = 10.3 m)
FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	30.43	38.74	91.10	135.99	193.91	267.24	471.09	607.82	968.58	3071.8	7698.9
	10	38.86	61.42	175.78	263.41	376.47	519.63	917.64	1184.6	1889.1	5996.5	15033.
	14	69.07	161.98	478.41	718.80	1028.9	1421.6	2513.5	3245.9	5178.7	16448.	41245.
600	8	31.64	39.81	91.10	135.99	193.91	267.24	471.09	607.82	968.58	3071.8	7698.9
	10	40.23	61.89	175.78	263.41	376.47	519.63	917.64	1184.6	1889.1	5996.5	15033.
	14	69.92	161.98	478.41	718.80	1028.9	1421.6	2513.5	3245.9	5178.7	16448.	41245.
650	8	32.82	40.88	91.11	135.99	193.91	267.24	471.09	607.82	968.58	3071.8	7698.9
	10	41.56	62.44	175.78	263.41	376.47	519.63	917.64	1184.6	1889.1	5996.5	15033.
	14	70.85	161.98	478.41	718.80	1028.9	1421.6	2513.5	3245.9	5178.7	16448.	41245.
700	8	33.96	41.93	91.12	135.99	193.91	267.24	471.09	607.82	968.58	3071.8	7698.9
	10	42.85	63.06	175.78	263.41	376.47	519.63	917.64	1184.6	1889.1	5996.5	15033.
	14	71.85	161.98	478.41	718.80	1028.9	1421.6	2513.5	3245.9	5178.7	16448.	41245.
750	8	35.06	42.96	91.14	135.99	193.91	267.24	471.09	607.82	968.58	3071.8	7698.9
	10	44.11	63.74	175.78	263.41	376.47	519.63	917.64	1184.6	1889.1	5996.5	15033.
	14	72.89	161.98	478.41	718.80	1028.9	1421.6	2513.5	3245.9	5178.7	16448.	41245.
800	8	36.14	43.98	91.16	135.99	193.91	267.24	471.09	607.82	968.58	3071.8	7698.9
	10	45.34	64.46	175.78	263.41	376.47	519.63	917.64	1184.6	1889.1	5996.5	15033.
	14	73.98	161.98	478.41	718.80	1028.9	1421.6	2513.5	3245.9	5178.7	16448.	41245.
850	8	37.18	44.98	91.21	135.99	193.91	267.24	471.09	607.82	968.58	3071.8	7698.9
	10	46.54	65.23	175.78	263.41	376.47	519.63	917.64	1184.6	1889.1	5996.5	15033.
	14	75.08	161.98	478.41	718.80	1028.9	1421.6	2513.5	3245.9	5178.7	16448.	41245.
900	8	38.21	45.97	91.26	135.99	193.91	267.24	471.09	607.82	968.58	3071.8	7698.9
	10	47.72	66.02	175.78	263.41	376.47	519.63	917.64	1184.6	1889.1	5996.5	15033.
	14	76.21	161.98	478.41	718.80	1028.9	1421.6	2513.5	3245.9	5178.7	16448.	41245.
950	8	39.20	46.94	91.34	135.99	193.91	267.24	471.09	607.82	968.58	3071.8	7698.9
	10	48.87	66.83	175.78	263.41	376.47	519.63	917.64	1184.6	1889.1	5996.5	15033.
	14	77.34	161.99	478.41	718.80	1028.9	1421.6	2513.5	3245.9	5178.7	16448.	41245.
1000	8	40.18	47.89	91.44	135.99	193.91	267.24	471.09	607.82	968.58	3071.8	7698.9
	10	50.00	67.66	175.78	263.41	376.47	519.63	917.64	1184.6	1889.1	5996.5	15033.
	14	78.49	161.99	478.41	718.80	1028.9	1421.6	2513.5	3245.9	5178.7	16448.	41245.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 15.0 m (RADIUS = 10.6 m)
 FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50	8	1.68	1.63	1.69	1.74	1.80	1.87	2.01	2.09	2.25	2.85	3.84	
	10	1.78	1.74	1.81	1.87	1.94	2.02	2.19	2.28	2.49	3.37	5.55	
	14	1.97	1.94	2.05	2.13	2.23	2.34	2.60	2.75	3.12	5.75	12.32	
100	8	2.00	1.95	2.03	2.09	2.16	2.24	2.41	2.50	2.70	3.38	4.36	
	10	2.15	2.11	2.20	2.28	2.36	2.46	2.66	2.77	3.01	3.95	5.75	
	14	2.42	2.39	2.54	2.64	2.76	2.89	3.19	3.36	3.75	5.94	12.32	
150	8	2.26	2.21	2.30	2.37	2.45	2.54	2.74	2.84	3.06	3.81	4.83	
	10	2.44	2.40	2.51	2.60	2.70	2.80	3.04	3.16	3.43	4.44	6.14	
	14	2.79	2.76	2.93	3.05	3.18	3.33	3.66	3.85	4.27	6.34	12.32	
200	8	2.48	2.43	2.53	2.62	2.71	2.80	3.02	3.13	3.37	4.18	5.26	
	10	2.70	2.66	2.79	2.88	2.99	3.11	3.36	3.50	3.79	4.87	6.56	
	14	3.10	3.08	3.27	3.40	3.55	3.71	4.07	4.27	4.73	6.78	12.34	
250	8	2.68	2.64	2.75	2.83	2.93	3.04	3.27	3.39	3.64	4.52	5.64	
	10	2.93	2.89	3.03	3.14	3.25	3.38	3.65	3.80	4.12	5.26	6.97	
	14	3.39	3.37	3.57	3.72	3.88	4.05	4.44	4.66	5.13	7.22	12.41	
300	8	2.87	2.82	2.94	3.04	3.14	3.26	3.50	3.63	3.90	4.83	6.00	
	10	3.15	3.11	3.26	3.37	3.50	3.63	3.92	4.08	4.41	5.62	7.36	
	14	3.66	3.64	3.85	4.01	4.18	4.37	4.78	5.01	5.51	7.64	12.54	
350	8	3.04	3.00	3.12	3.22	3.34	3.46	3.71	3.85	4.14	5.11	6.34	
	10	3.35	3.31	3.47	3.59	3.72	3.86	4.17	4.34	4.69	5.95	7.73	
	14	3.90	3.88	4.12	4.28	4.46	4.66	5.10	5.34	5.86	8.04	12.72	
400	8	3.21	3.16	3.30	3.40	3.52	3.65	3.92	4.06	4.36	5.38	6.65	
	10	3.53	3.50	3.67	3.79	3.93	4.08	4.41	4.58	4.95	6.27	8.09	
	14	4.13	4.12	4.36	4.54	4.73	4.94	5.39	5.64	6.19	8.42	12.96	
450	8	3.36	3.31	3.46	3.57	3.69	3.83	4.11	4.26	4.58	5.64	6.95	
	10	3.71	3.67	3.85	3.99	4.13	4.29	4.63	4.82	5.20	6.57	8.43	
	14	4.35	4.34	4.60	4.78	4.98	5.20	5.68	5.94	6.50	8.78	13.22	
500	8	3.51	3.46	3.62	3.73	3.86	4.00	4.30	4.45	4.78	5.88	7.24	
	10	3.88	3.85	4.03	4.17	4.33	4.49	4.85	5.04	5.44	6.85	8.76	
	14	4.57	4.55	4.82	5.01	5.22	5.45	5.94	6.21	6.80	9.13	13.50	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 15.0 m (RADIUS = 10.6 m)
FIRE GROWTH: ULTRAFAST (ALPHA = .1875 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
		(m*s) ^{1/2}										
550	8	3.65	3.61	3.77	3.89	4.02	4.16	4.47	4.63	4.97	6.12	7.51
	10	4.05	4.01	4.21	4.35	4.51	4.68	5.05	5.25	5.67	7.12	9.07
	14	4.77	4.75	5.04	5.24	5.45	5.69	6.20	6.48	7.09	9.47	13.79
600	8	3.79	3.74	3.91	4.04	4.17	4.32	4.64	4.81	5.16	6.34	7.78
	10	4.21	4.17	4.37	4.52	4.69	4.87	5.25	5.45	5.88	7.39	9.38
	14	4.96	4.95	5.25	5.45	5.68	5.92	6.45	6.74	7.36	9.80	14.09
650	8	3.93	3.88	4.05	4.18	4.32	4.48	4.81	4.98	5.34	6.56	8.03
	10	4.36	4.32	4.53	4.69	4.86	5.05	5.44	5.65	6.09	7.64	9.67
	14	5.15	5.14	5.45	5.66	5.89	6.14	6.69	6.99	7.63	10.11	14.39
700	8	4.06	4.01	4.18	4.32	4.47	4.63	4.97	5.14	5.52	6.77	8.28
	10	4.51	4.47	4.69	4.85	5.03	5.22	5.62	5.84	6.30	7.89	9.96
	14	5.34	5.32	5.64	5.86	6.10	6.36	6.92	7.23	7.89	10.42	14.69
750	8	4.18	4.13	4.32	4.45	4.61	4.77	5.12	5.30	5.69	6.98	8.52
	10	4.65	4.61	4.84	5.01	5.19	5.38	5.80	6.03	6.50	8.12	10.23
	14	5.51	5.50	5.83	6.05	6.30	6.57	7.15	7.46	8.14	10.72	14.99
800	8	4.30	4.25	4.44	4.59	4.74	4.91	5.27	5.46	5.85	7.17	8.75
	10	4.79	4.75	4.99	5.16	5.35	5.55	5.98	6.21	6.69	8.36	10.50
	14	5.69	5.67	6.01	6.24	6.50	6.77	7.36	7.69	8.38	11.01	15.29
850	8	4.42	4.37	4.57	4.71	4.88	5.05	5.42	5.61	6.02	7.37	8.98
	10	4.93	4.89	5.13	5.31	5.50	5.71	6.15	6.38	6.88	8.58	10.77
	14	5.85	5.84	6.19	6.43	6.69	6.97	7.58	7.91	8.62	11.29	15.59
900	8	4.54	4.49	4.69	4.84	5.01	5.18	5.56	5.76	6.17	7.56	9.20
	10	5.06	5.02	5.27	5.45	5.65	5.86	6.31	6.55	7.06	8.80	11.02
	14	6.02	6.01	6.36	6.61	6.87	7.16	7.78	8.12	8.85	11.57	15.88
950	8	4.65	4.60	4.81	4.96	5.13	5.31	5.70	5.90	6.33	7.74	9.41
	10	5.19	5.15	5.41	5.59	5.80	6.01	6.48	6.72	7.24	9.02	11.28
	14	6.18	6.17	6.53	6.78	7.06	7.35	7.99	8.33	9.07	11.84	16.17
1000	8	4.76	4.71	4.93	5.08	5.26	5.44	5.84	6.04	6.48	7.92	9.63
	10	5.32	5.28	5.54	5.73	5.94	6.16	6.63	6.88	7.41	9.23	11.52
	14	6.34	6.33	6.70	6.95	7.23	7.53	8.19	8.54	9.29	12.10	16.45

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 15.0 m (RADIUS = 10.6 m)
FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE
TIME INDEX
RATE
OF RISE

(m*s)^{1/2} °C/min

CEILING HEIGHT, m

	1	2	4	5	6	7	9	10	12	18	24
50	2.74 2.97 3.44	2.72 2.99 3.57	2.93 3.30 4.28	3.08 3.54 4.92	3.27 3.85 5.95	3.49 4.24 7.55	4.08 5.54 12.24	4.50 6.61 15.36	5.80 9.63 23.55	14.73 26.94 70.58	34.01 64.34 172.73
100	3.39 3.74 4.40	3.39 3.77 4.55	3.65 4.14 5.30	3.83 4.41 5.88	4.05 4.73 6.70	4.29 5.12 7.90	4.90 6.21 12.24	5.28 7.03 15.36	6.33 9.67 23.55	14.73 26.94 70.58	34.01 64.34 172.73
150	3.92 4.35 5.17	3.92 4.39 5.33	4.22 4.81 6.14	4.43 5.11 6.73	4.67 5.46 7.50	4.94 5.86 8.56	5.59 6.93 12.34	5.98 7.66 15.37	6.98 9.92 23.55	14.74 26.94 70.58	34.01 64.34 172.73
200	4.38 4.88 5.83	4.39 4.93 6.01	4.72 5.40 6.87	4.95 5.71 7.48	5.21 6.08 8.25	5.50 6.51 9.25	6.18 7.59 12.62	6.59 8.30 15.45	7.59 10.35 23.55	14.77 26.94 70.58	34.01 64.34 172.73
250	4.80 5.36 6.43	4.81 5.42 6.63	5.17 5.92 7.53	5.42 6.26 8.16	5.69 6.65 8.93	6.00 7.09 9.92	6.73 8.20 13.04	7.15 8.91 15.63	8.16 10.85 23.56	14.88 26.94 70.58	34.01 64.34 172.73
300	5.18 5.80 6.98	5.19 5.86 7.19	5.58 6.40 8.13	5.84 6.76 8.78	6.14 7.17 9.57	6.47 7.63 10.56	7.22 8.77 13.53	7.66 9.48 15.92	8.70 11.37 23.57	15.08 26.94 70.58	34.01 64.34 172.73
350	5.54 6.21 7.49	5.55 6.28 7.71	5.96 6.84 8.69	6.24 7.22 9.37	6.55 7.65 10.17	6.90 8.13 11.16	7.69 9.30 14.04	8.14 10.02 16.29	9.20 11.89 23.61	15.36 26.95 70.58	34.01 64.34 172.73
400	5.87 6.60 7.98	5.89 6.67 8.20	6.32 7.26 9.22	6.62 7.66 9.92	6.94 8.10 10.74	7.30 8.61 11.74	8.12 9.81 14.57	8.59 10.54 16.70	9.68 12.40 23.69	15.68 26.96 70.58	34.01 64.34 172.73
450	6.19 6.97 8.44	6.21 7.05 8.67	6.67 7.66 9.73	6.97 8.07 10.44	7.31 8.54 11.28	7.69 9.05 12.29	8.54 10.29 15.09	9.02 11.03 17.15	10.14 12.89 23.82	16.04 26.99 70.58	34.01 64.34 172.73
500	6.50 7.32 8.87	6.52 7.40 9.11	6.99 8.04 10.21	7.31 8.47 10.94	7.67 8.95 11.80	8.05 9.48 12.82	8.93 10.74 15.60	9.43 11.50 17.60	10.57 13.37 24.00	16.41 27.04 70.58	34.02 64.34 172.73

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 15.0 m (RADIUS = 10.6 m)
 FIRE GROWTH: FAST (ALPHA = .0469 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	6.79	6.81	7.31	7.64	8.00	8.41	9.31	9.82	10.99	16.80	34.02	
	10	7.66	7.74	8.41	8.85	9.34	9.89	11.18	11.95	13.83	27.11	64.34	
	14	9.29	9.54	10.67	11.42	12.29	13.33	16.11	18.07	24.22	70.58	172.73	
600	8	7.07	7.10	7.61	7.95	8.33	8.74	9.68	10.20	11.39	17.18	34.04	
	10	7.98	8.07	8.76	9.21	9.72	10.29	11.61	12.39	14.29	27.22	64.34	
	14	9.70	9.95	11.11	11.88	12.77	13.82	16.60	18.53	24.48	70.58	172.73	
650	8	7.34	7.37	7.90	8.25	8.64	9.07	10.03	10.57	11.78	17.57	34.06	
	10	8.30	8.39	9.10	9.56	10.09	10.67	12.02	12.81	14.73	27.35	64.34	
	14	10.09	10.35	11.54	12.32	13.23	14.30	17.08	18.99	24.76	70.58	172.73	
700	8	7.61	7.64	8.18	8.54	8.95	9.39	10.37	10.92	12.16	17.96	34.09	
	10	8.60	8.70	9.43	9.91	10.44	11.04	12.41	13.22	15.15	27.51	64.34	
	14	10.47	10.73	11.95	12.75	13.68	14.76	17.56	19.45	25.08	70.58	172.73	
750	8	7.86	7.90	8.45	8.83	9.24	9.69	10.70	11.26	12.53	18.35	34.13	
	10	8.90	8.99	9.74	10.24	10.79	11.39	12.80	13.62	15.57	27.70	64.34	
	14	10.84	11.11	12.35	13.17	14.11	15.21	18.02	19.90	25.41	70.58	172.73	
800	8	8.11	8.15	8.72	9.10	9.53	9.99	11.02	11.59	12.88	18.73	34.19	
	10	9.18	9.28	10.05	10.56	11.12	11.74	13.17	14.00	15.98	27.91	64.34	
	14	11.19	11.47	12.74	13.57	14.54	15.64	18.47	20.34	25.75	70.58	172.73	
850	8	8.36	8.39	8.98	9.37	9.81	10.28	11.33	11.92	13.23	19.11	34.27	
	10	9.46	9.57	10.35	10.87	11.45	12.08	13.54	14.38	16.37	28.14	64.34	
	14	11.54	11.82	13.12	13.97	14.95	16.07	18.91	20.78	26.10	70.58	172.73	
900	8	8.59	8.63	9.23	9.64	10.08	10.56	11.64	12.23	13.57	19.48	34.36	
	10	9.74	9.84	10.65	11.18	11.76	12.41	13.89	14.75	16.76	28.39	64.34	
	14	11.88	12.17	13.49	14.36	15.35	16.48	19.35	21.21	26.47	70.58	172.73	
950	8	8.83	8.86	9.48	9.89	10.35	10.84	11.94	12.54	13.90	19.84	34.46	
	10	10.01	10.11	10.94	11.48	12.08	12.73	14.24	15.11	17.14	28.65	64.34	
	14	12.22	12.51	13.85	14.73	15.74	16.89	19.78	21.64	26.83	70.58	172.73	
1000	8	9.05	9.09	9.72	10.14	10.61	11.11	12.23	12.85	14.22	20.21	34.59	
	10	10.27	10.38	11.22	11.77	12.38	13.05	14.58	15.46	17.52	28.93	64.34	
	14	12.54	12.84	14.21	15.10	16.12	17.29	20.19	22.06	27.20	70.58	172.73	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 15.0 m (RADIUS = 10.6 m)
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50 (m*s) ^{1/2}	8	5.00	5.45	8.10	11.07	15.07	20.11	34.01	43.27	67.57	207.52	512.02	
	10	5.78	6.82	13.86	19.92	27.69	37.49	64.53	82.56	129.91	402.90	997.27	
	14	7.85	13.02	34.98	51.54	72.79	99.58	173.59	222.97	352.67	1101.1	2731.4	
100	8	6.41	6.88	9.06	11.36	15.09	20.11	34.01	43.27	67.57	207.52	512.02	
	10	7.42	8.38	13.97	19.92	27.69	37.49	64.53	82.56	129.91	402.90	997.27	
	14	9.82	13.58	34.98	51.54	72.79	99.58	173.59	222.97	352.67	1101.1	2731.4	
150	8	7.54	8.03	10.13	12.08	15.29	20.13	34.01	43.27	67.57	207.52	512.02	
	10	8.73	9.70	14.48	19.96	27.69	37.49	64.53	82.56	129.91	402.90	997.27	
	14	11.45	14.69	34.98	51.54	72.79	99.58	173.59	222.97	352.67	1101.1	2731.4	
200	8	8.52	9.03	11.14	12.94	15.76	20.22	34.01	43.27	67.57	207.52	512.02	
	10	9.87	10.85	15.26	20.15	27.70	37.49	64.53	82.56	129.91	402.90	997.27	
	14	12.88	15.89	34.98	51.54	72.79	99.58	173.59	222.97	352.67	1101.1	2731.4	
250	8	9.39	9.93	12.07	13.81	16.39	20.45	34.01	43.27	67.57	207.52	512.02	
	10	10.89	11.90	16.13	20.53	27.74	37.49	64.53	82.56	129.91	402.90	997.27	
	14	14.16	17.07	34.99	51.54	72.79	99.58	173.59	222.97	352.67	1101.1	2731.4	
300	8	10.20	10.75	12.94	14.64	17.09	20.83	34.02	43.27	67.57	207.52	512.02	
	10	11.83	12.86	17.00	21.06	27.84	37.49	64.53	82.56	129.91	402.90	997.27	
	14	15.34	18.20	35.04	51.54	72.79	99.58	173.59	222.97	352.67	1101.1	2731.4	
350	8	10.95	11.52	13.75	15.45	17.81	21.31	34.04	43.27	67.57	207.52	512.02	
	10	12.71	13.75	17.85	21.68	28.04	37.51	64.53	82.56	129.91	402.90	997.27	
	14	16.45	19.27	35.15	51.54	72.79	99.58	173.59	222.97	352.67	1101.1	2731.4	
400	8	11.65	12.25	14.52	16.22	18.52	21.85	34.08	43.28	67.57	207.52	512.02	
	10	13.53	14.60	18.69	22.35	28.33	37.54	64.53	82.56	129.91	402.90	997.27	
	14	17.49	20.29	35.35	51.54	72.79	99.58	173.59	222.97	352.67	1101.1	2731.4	
450	8	12.32	12.93	15.25	16.96	19.23	22.44	34.16	43.28	67.57	207.52	512.02	
	10	14.31	15.40	19.49	23.04	28.71	37.61	64.53	82.56	129.91	402.90	997.27	
	14	18.47	21.28	35.63	51.55	72.79	99.58	173.59	222.97	352.67	1101.1	2731.4	
500	8	12.96	13.59	15.95	17.67	19.92	23.03	34.29	43.30	67.57	207.52	512.02	
	10	15.06	16.16	20.27	23.74	29.15	37.72	64.53	82.56	129.91	402.90	997.27	
	14	19.41	22.22	36.00	51.58	72.79	99.58	173.59	222.97	352.67	1101.1	2731.4	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 15.0 m (RADIUS = 10.6 m)³
FIRE GROWTH: MEDIUM (ALPHA = .0117 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
550	8	13.58	14.21	16.63	18.35	20.60	23.64	34.47	43.33	67.57	207.52	512.02	
	10	15.77	16.89	21.03	24.43	29.64	37.89	64.53	82.56	129.91	402.90	997.27	
	14	20.31	23.12	36.44	51.62	72.79	99.58	173.59	222.97	352.67	1101.1	2731.4	
600	8	14.17	14.82	17.27	19.02	21.25	24.25	34.69	43.38	67.57	207.52	512.02	
	10	16.46	17.60	21.76	25.12	30.16	38.10	64.53	82.56	129.91	402.90	997.27	
	14	21.18	24.00	36.93	51.68	72.79	99.58	173.59	222.97	352.67	1101.1	2731.4	
650	8	14.74	15.40	17.90	19.66	21.90	24.85	34.97	43.46	67.57	207.52	512.02	
	10	17.12	18.28	22.47	25.80	30.71	38.36	64.53	82.56	129.91	402.90	997.27	
	14	22.01	24.85	37.47	51.78	72.80	99.58	173.59	222.97	352.67	1101.1	2731.4	
700	8	15.29	15.96	18.51	20.28	22.53	25.45	35.28	43.56	67.57	207.52	512.02	
	10	17.76	18.93	23.16	26.47	31.27	38.67	64.54	82.56	129.91	402.90	997.27	
	14	22.82	25.67	38.03	51.92	72.80	99.58	173.59	222.97	352.67	1101.1	2731.4	
750	8	15.82	16.51	19.10	20.89	23.14	26.05	35.62	43.69	67.58	207.52	512.02	
	10	18.38	19.57	23.83	27.13	31.83	39.01	64.55	82.56	129.91	402.90	997.27	
	14	23.61	26.47	38.62	52.09	72.81	99.58	173.59	222.97	352.67	1101.1	2731.4	
800	8	16.35	17.04	19.67	21.48	23.74	26.63	35.99	43.86	67.58	207.52	512.02	
	10	18.99	20.19	24.49	27.77	32.41	39.39	64.56	82.56	129.91	402.90	997.27	
	14	24.37	27.25	39.22	52.30	72.82	99.58	173.59	222.97	352.67	1101.1	2731.4	
850	8	16.85	17.56	20.23	22.06	24.32	27.21	36.39	44.05	67.58	207.52	512.02	
	10	19.58	20.80	25.13	28.41	32.98	39.79	64.57	82.56	129.91	402.90	997.27	
	14	25.12	28.01	39.83	52.55	72.84	99.58	173.59	222.97	352.67	1101.1	2731.4	
900	8	17.35	18.07	20.77	22.62	24.90	27.77	36.80	44.27	67.59	207.52	512.02	
	10	20.16	21.39	25.76	29.04	33.56	40.21	64.60	82.57	129.91	402.90	997.27	
	14	25.84	28.75	40.45	52.83	72.87	99.58	173.59	222.97	352.67	1101.1	2731.4	
950	8	17.83	18.56	21.30	23.17	25.46	28.33	37.22	44.52	67.60	207.52	512.02	
	10	20.72	21.96	26.37	29.65	34.13	40.65	64.64	82.57	129.91	402.90	997.27	
	14	26.55	29.47	41.07	53.15	72.91	99.58	173.59	222.97	352.67	1101.1	2731.4	
1000	8	18.31	19.04	21.82	23.71	26.01	28.88	37.66	44.79	67.62	207.52	512.02	
	10	21.27	22.53	26.97	30.25	34.70	41.10	64.69	82.57	129.91	402.90	997.27	
	14	27.25	30.18	41.70	53.49	72.96	99.58	173.59	222.97	352.67	1101.1	2731.4	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 15.0 m (RADIUS = 10.6 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX	RATE OF RISE °C/min	CEILING HEIGHT, m											
		1	2	4	5	6	7	9	10	12	18	24	
50 (m*s) ^{1/2}	8	16.20	35.95	101.50	150.89	214.27	294.15	514.92	662.24	1049.3	3283.1	8149.7	
	10	29.10	68.04	196.05	292.46	416.19	572.15	1003.2	1290.9	2046.6	6409.1	15914.	
	14	75.63	182.70	533.94	798.40	1137.8	1565.6	2748.1	3537.4	5610.9	17581.	43661.	
100	8	17.65	35.95	101.50	150.89	214.27	294.15	514.92	662.24	1049.3	3283.1	8149.7	
	10	29.17	68.04	196.05	292.46	416.19	572.15	1003.2	1290.9	2046.6	6409.1	15914.	
	14	75.63	182.70	533.94	798.40	1137.8	1565.6	2748.1	3537.4	5610.9	17581.	43661.	
150	8	19.59	35.97	101.50	150.89	214.27	294.15	514.92	662.24	1049.3	3283.1	8149.7	
	10	29.74	68.04	196.05	292.46	416.19	572.15	1003.2	1290.9	2046.6	6409.1	15914.	
	14	75.63	182.70	533.94	798.40	1137.8	1565.6	2748.1	3537.4	5610.9	17581.	43661.	
200	8	21.49	36.09	101.50	150.89	214.27	294.15	514.92	662.24	1049.3	3283.1	8149.7	
	10	30.89	68.04	196.05	292.46	416.19	572.15	1003.2	1290.9	2046.6	6409.1	15914.	
	14	75.63	182.70	533.94	798.40	1137.8	1565.6	2748.1	3537.4	5610.9	17581.	43661.	
250	8	23.27	36.43	101.50	150.89	214.27	294.15	514.92	662.24	1049.3	3283.1	8149.7	
	10	32.34	68.04	196.05	292.46	416.19	572.15	1003.2	1290.9	2046.6	6409.1	15914.	
	14	75.63	182.70	533.94	798.40	1137.8	1565.6	2748.1	3537.4	5610.9	17581.	43661.	
300	8	24.94	37.01	101.50	150.89	214.27	294.15	514.92	662.24	1049.3	3283.1	8149.7	
	10	33.89	68.04	196.05	292.46	416.19	572.15	1003.2	1290.9	2046.6	6409.1	15914.	
	14	75.65	182.70	533.94	798.40	1137.8	1565.6	2748.1	3537.4	5610.9	17581.	43661.	
350	8	26.52	37.79	101.50	150.89	214.27	294.15	514.92	662.24	1049.3	3283.1	8149.7	
	10	35.46	68.06	196.05	292.46	416.19	572.15	1003.2	1290.9	2046.6	6409.1	15914.	
	14	75.72	182.70	533.94	798.40	1137.8	1565.6	2748.1	3537.4	5610.9	17581.	43661.	
400	8	28.02	38.70	101.50	150.89	214.27	294.15	514.92	662.24	1049.3	3283.1	8149.7	
	10	37.01	68.10	196.05	292.46	416.19	572.15	1003.2	1290.9	2046.6	6409.1	15914.	
	14	75.87	182.70	533.94	798.40	1137.8	1565.6	2748.1	3537.4	5610.9	17581.	43661.	
450	8	29.44	39.68	101.50	150.89	214.27	294.15	514.92	662.24	1049.3	3283.1	8149.7	
	10	38.53	68.19	196.05	292.46	416.19	572.15	1003.2	1290.9	2046.6	6409.1	15914.	
	14	76.14	182.70	533.94	798.40	1137.8	1565.6	2748.1	3537.4	5610.9	17581.	43661.	
500	8	30.81	40.71	101.50	150.89	214.27	294.15	514.92	662.24	1049.3	3283.1	8149.7	
	10	40.01	68.34	196.05	292.46	416.19	572.15	1003.2	1290.9	2046.6	6409.1	15914.	
	14	76.53	182.70	533.94	798.40	1137.8	1565.6	2748.1	3537.4	5610.9	17581.	43661.	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 15.0 m (RADIUS = 10.6 m)³
 FIRE GROWTH: SLOW (ALPHA = .00293 kJ/s³)

RESPONSE TIME INDEX (m*s) ^{1/2}	RATE OF RISE °C/min	CEILING HEIGHT, m										
		1	2	4	5	6	7	9	10	12	18	24
550	8	32.12	41.76	101.50	150.89	214.27	294.15	514.92	662.24	1049.3	3283.1	8149.7
	10	41.46	68.57	196.05	292.46	416.19	572.15	1003.2	1290.9	2046.6	6409.1	15914.
	14	77.05	182.70	533.94	798.40	1137.8	1565.6	2748.1	3537.4	5610.9	17581.	43661.
600	8	33.39	42.82	101.51	150.89	214.27	294.15	514.92	662.24	1049.3	3283.1	8149.7
	10	42.86	68.89	196.05	292.46	416.19	572.15	1003.2	1290.9	2046.6	6409.1	15914.
	14	77.70	182.70	533.94	798.40	1137.8	1565.6	2748.1	3537.4	5610.9	17581.	43661.
650	8	34.61	43.88	101.51	150.89	214.27	294.15	514.92	662.24	1049.3	3283.1	8149.7
	10	44.23	69.28	196.05	292.46	416.19	572.15	1003.2	1290.9	2046.6	6409.1	15914.
	14	78.45	182.70	533.94	798.40	1137.8	1565.6	2748.1	3537.4	5610.9	17581.	43661.
700	8	35.80	44.93	101.51	150.89	214.27	294.15	514.92	662.24	1049.3	3283.1	8149.7
	10	45.57	69.76	196.05	292.46	416.19	572.15	1003.2	1290.9	2046.6	6409.1	15914.
	14	79.29	182.70	533.94	798.40	1137.8	1565.6	2748.1	3537.4	5610.9	17581.	43661.
750	8	36.95	45.97	101.52	150.89	214.27	294.15	514.92	662.24	1049.3	3283.1	8149.7
	10	46.87	70.30	196.05	292.46	416.19	572.15	1003.2	1290.9	2046.6	6409.1	15914.
	14	80.20	182.70	533.94	798.40	1137.8	1565.6	2748.1	3537.4	5610.9	17581.	43661.
800	8	38.07	47.00	101.53	150.89	214.27	294.15	514.92	662.24	1049.3	3283.1	8149.7
	10	48.14	70.91	196.05	292.46	416.19	572.15	1003.2	1290.9	2046.6	6409.1	15914.
	14	81.17	182.70	533.94	798.40	1137.8	1565.6	2748.1	3537.4	5610.9	17581.	43661.
850	8	39.16	48.02	101.55	150.89	214.27	294.15	514.92	662.24	1049.3	3283.1	8149.7
	10	49.38	71.57	196.05	292.46	416.19	572.15	1003.2	1290.9	2046.6	6409.1	15914.
	14	82.18	182.70	533.94	798.40	1137.8	1565.6	2748.1	3537.4	5610.9	17581.	43661.
900	8	40.22	49.02	101.57	150.89	214.27	294.15	514.92	662.24	1049.3	3283.1	8149.7
	10	50.60	72.26	196.05	292.46	416.19	572.15	1003.2	1290.9	2046.6	6409.1	15914.
	14	83.23	182.70	533.94	798.40	1137.8	1565.6	2748.1	3537.4	5610.9	17581.	43661.
950	8	41.27	50.01	101.61	150.89	214.27	294.15	514.92	662.24	1049.3	3283.1	8149.7
	10	51.79	73.00	196.05	292.46	416.19	572.15	1003.2	1290.9	2046.6	6409.1	15914.
	14	84.30	182.71	533.94	798.40	1137.8	1565.6	2748.1	3537.4	5610.9	17581.	43661.
1000	8	42.28	50.98	101.66	150.89	214.27	294.15	514.92	662.24	1049.3	3283.1	8149.7
	10	52.96	73.76	196.05	292.46	416.19	572.15	1003.2	1290.9	2046.6	6409.1	15914.
	14	85.39	182.71	533.94	798.40	1137.8	1565.6	2748.1	3537.4	5610.9	17581.	43661.

U.S. DEPT. OF COMM. BIBLIOGRAPHIC DATA SHEET <i>(See instructions)</i>	1. PUBLICATION OR REPORT NO. NBS/SP-713	2. Performing Organ. Report No.	3. Publication Date April 1986
4. TITLE AND SUBTITLE Evaluating Thermal Fire Detection Systems [S.I. Units]			
5. AUTHOR(S) David W. Stroup, David D. Evans, Phyllis Martin			
6. PERFORMING ORGANIZATION <i>(If joint or other than NBS, see instructions)</i> National Bureau of Standards Department of Commerce Gaithersburg, MD 20899			7. Contract/Grant No. 8. Type of Report & Period Covered Final
9. SPONSORING ORGANIZATION NAME AND COMPLETE ADDRESS <i>(Street, City, State, ZIP)</i> Same as item 6.			
10. SUPPLEMENTARY NOTES Library of Congress Catalog Card Number: 86-600520. <input type="checkbox"/> Document describes a computer program; SF-185, FIPS Software Summary, is attached.			
11. ABSTRACT <i>(A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here)</i> <p>This report presents a methodology for evaluating heat detection systems installed in buildings. Previous work for use primarily in designing new thermal fire detection systems was used as a starting point. The previous work was enhanced and supplemented to make it more useful for evaluating existing systems. The resulting equations were programmed into a user interactive computer program. This program is available in both BASIC and FORTRAN and will run on mainframes as well as personal computers. In addition, a modified version of the FORTRAN program was used to develop an extensive set of tables listing detector activation times for given building geometries, detector characteristics, and fire growth rates. These tables are useful for quick evaluation of alternative heat detector installations. Finally, practical examples are included to illustrate the use of the tables and computer programs.</p>			
12. KEY WORDS <i>(Six to twelve entries; alphabetical order; capitalize only proper names; and separate key words by semicolons)</i> fire alarm systems; fire detection; fire detection systems; fire hazard assessment; fire protection; fire suppression; heat detectors; sprinkler systems			
13. AVAILABILITY <input checked="" type="checkbox"/> Unlimited <input type="checkbox"/> For Official Distribution. Do Not Release to NTIS <input checked="" type="checkbox"/> Order From Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. <input type="checkbox"/> Order From National Technical Information Service (NTIS), Springfield, VA. 22161			14. NO. OF PRINTED PAGES 557 15. Price

NBS *Technical Publications*

Periodical

Journal of Research—The Journal of Research of the National Bureau of Standards reports NBS research and development in those disciplines of the physical and engineering sciences in which the Bureau is active. These include physics, chemistry, engineering, mathematics, and computer sciences. Papers cover a broad range of subjects, with major emphasis on measurement methodology and the basic technology underlying standardization. Also included from time to time are survey articles on topics closely related to the Bureau's technical and scientific programs. Issued six times a year.

Nonperiodicals

Monographs—Major contributions to the technical literature on various subjects related to the Bureau's scientific and technical activities.

Handbooks—Recommended codes of engineering and industrial practice (including safety codes) developed in cooperation with interested industries, professional organizations, and regulatory bodies.

Special Publications—Include proceedings of conferences sponsored by NBS, NBS annual reports, and other special publications appropriate to this grouping such as wall charts, pocket cards, and bibliographies.

Applied Mathematics Series—Mathematical tables, manuals, and studies of special interest to physicists, engineers, chemists, biologists, mathematicians, computer programmers, and others engaged in scientific and technical work.

National Standard Reference Data Series—Provides quantitative data on the physical and chemical properties of materials, compiled from the world's literature and critically evaluated. Developed under a worldwide program coordinated by NBS under the authority of the National Standard Data Act (Public Law 90-396).

NOTE: The Journal of Physical and Chemical Reference Data (JPCRD) is published quarterly for NBS by the American Chemical Society (ACS) and the American Institute of Physics (AIP). Subscriptions, reprints, and supplements are available from ACS, 1155 Sixteenth St., NW, Washington, DC 20056.

Building Science Series—Disseminates technical information developed at the Bureau on building materials, components, systems, and whole structures. The series presents research results, test methods, and performance criteria related to the structural and environmental functions and the durability and safety characteristics of building elements and systems.

Technical Notes—Studies or reports which are complete in themselves but restrictive in their treatment of a subject. Analogous to monographs but not so comprehensive in scope or definitive in treatment of the subject area. Often serve as a vehicle for final reports of work performed at NBS under the sponsorship of other government agencies.

Voluntary Product Standards—Developed under procedures published by the Department of Commerce in Part 10, Title 15, of the Code of Federal Regulations. The standards establish nationally recognized requirements for products, and provide all concerned interests with a basis for common understanding of the characteristics of the products. NBS administers this program as a supplement to the activities of the private sector standardizing organizations.

Consumer Information Series—Practical information, based on NBS research and experience, covering areas of interest to the consumer. Easily understandable language and illustrations provide useful background knowledge for shopping in today's technological marketplace.

Order the above NBS publications from: Superintendent of Documents, Government Printing Office, Washington, DC 20402.

Order the following NBS publications—FIPS and NBSIR's—from the National Technical Information Service, Springfield, VA 22161.

Federal Information Processing Standards Publications (FIPS PUB)—Publications in this series collectively constitute the Federal Information Processing Standards Register. The Register serves as the official source of information in the Federal Government regarding standards issued by NBS pursuant to the Federal Property and Administrative Services Act of 1949 as amended, Public Law 89-306 (79 Stat. 1127), and as implemented by Executive Order 11717 (38 FR 12315, dated May 11, 1973) and Part 6 of Title 15 CFR (Code of Federal Regulations).

NBS Interagency Reports (NBSIR)—A special series of interim or final reports on work performed by NBS for outside sponsors (both government and non-government). In general, initial distribution is handled by the sponsor; public distribution is by the National Technical Information Service, Springfield, VA 22161, in paper copy or microfiche form.

U.S. Department of Commerce
National Bureau of Standards
Gaithersburg, MD 20899

Official Business
Penalty for Private Use \$300